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Noise Pollution and Its Effect on Mate Quality Choice of Cricket, *Teleogryllus commodus*

Haylee Ann Crowle, Jessica Briggs
Biological Sciences, UNH Durham

Crickets are a species known for their fast, high-pitched, acoustic calls that are used for male advertisement to potential mates and rivals. Considered an honest signal of mate quality, females rely on these calls to assess potential mates. Previous studies have found there is a correlation between body size and frequency in many cricket species, as body size increases, frequency decreases. The Australian black field cricket, Teleogryllus commodus, has one of the most complex gryllid calls, discernable by the amplitude modulated chirp at the beginning of their call sequence. Currently, there has been no investigations into whether that amplitude modulation is correlated with male body size or mate quality. We hypothesize that frequency and amplitude modulation are correlated with body size. We recorded and analyzed calls from 22 males, measured morphological features, and used logistic regression to determine any correlations between body size and call characteristics. A correlation was found between chirp pulses per second and pronotum length and between change in chirp amplitude and femur length. These finding suggest females may be using the amplitude modulated chirp to assess the quality of potential mates. Future research should focus on how the amplitude modulation affects female choice and how wing morphology may also influence male call structure.

Presenter:	Haylee Ann Crowle
Presenter's Major(s):	Animal Science
Year at UNH:	Senior
Research Interest:	Animal Behavior
Adviser:	Jessica Briggs

The Role of Histone Variants in Regulating Gene Expression in the Protozoan Parasite *Toxoplasma gondii*

Chiara Jo Antonioli, Vicki Jeffers

Toxoplasma gondii is a protozoan parasite that infects every warm-blooded animal, including humans. Infection with *Toxoplasma* may lead to opportunistic infection in immunocompromised and other vulnerable people. Understanding the factors that regulate essential processes in the parasite, such as gene expression, could lead to the development of new treatments for toxoplasmosis. Histones are nuclear proteins that help to package the genome. There are several variants of histone proteins, which can be associated with either gene activation or repression. In other species, the histone H2A.Z is associated with gene activation. This study aims to understand the epigenetic relationship between the H2A.Z variant and gene activation in *Toxoplasma*, and the other epigenetic factors that control H2A.Z function. We are engineering a strain of *Toxoplasma* that expresses H2A.Z with an epitope tag added to it. The epitope tag will enable detection and enrichment of the H2A.Z protein, to determine the location of H2A.Z proteins along the genome using CUT&TAG. Based on previous studies that show H2A.Z may be involved in gene activation, we hypothesize that the H2A.Z variant binds near the transcriptional start site of active genes. Other ongoing studies will determine the epigenetic regulators that control H2A.Z genome localization in *Toxoplasma* to regulate gene expression.

Presenter:	Chiara Jo Antonioli
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Adviser:	Vicki Jeffers

EEG Brainwave Pattern of App23 Mice (an Alzheimer's Disease Mouse Model) under Anesthesia

Victoria Denovellis, Xuanmao Chen

Alzheimer’s Disease (AD) is a neurodegenerative disease that affects the cognitive function of individuals. AD treatments are far from adequate. Currently, there is a lack of a biomarker for early diagnosis of AD to enable timely intervention. Prior studies have shown that AD is correlated with disrupted electroencephalogram (EEG) brainwave patterns during sleep. However, the sleep alteration in AD is detected in the late stage of the disease, when cognitive deficits have already manifested. Under isoflurane-induced anesthesia, human and rodent brains also exhibit rhythmic slow-wave EEG pattern. We aimed to examine whether EEG brainwave patterns under anesthesia are altered in App23 mice (an AD mouse model). We compared EEG brainwave data in App23 mice both at young and old ages to evaluate whether App23 mutant overexpression affects EEG brainwave patterns under anesthesia. We found that young App23 mice (at 3 month old) exhibit altered slow wave EEG patterns under isoflurane-induced anesthesia. These results suggest a new method to probe early signs of AD before manifestations of cognitive deficits occur.

Presenter:	Victoria Denovellis
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Junior
Research Interest:	Alzheimer's Disease Mouse Models
Adviser:	Xuanmao Chen

Methionine Prototype Trial Using the Area Under the Curve Method

Carolyn Kennedy, Nancy Whitehouse
COLSA, UNH Durham

In this experiment, 6 multiparous Holstein cows in late stages of lactation were utilized in a replicated 3x3 Latin square study. In dairy cows, methionine is an essential ingredient for synthesizing milk proteins. Methionine is a limiting amino acid in the diet of dairy cattle, therefore methionine must be supplemented to the cow's diet. Methionine is easily degraded by microorganisms found in the rumen of cows, so methionine must be administered in a protected form. Cows were fed the same basal MTR diet and received one of three protected methionine treatments: 30 g Met from Smartamine M, 30 g Met Prototype A, and 30 g Met Prototype B. The experiment lasted 21 days, divided into 7 day periods. Data analyses was done via plasma amino acid analyses. Blood samples were collected 6, 3, and 0 hours before cows were treated, as well as 6, 9, 12, 15, 18, 21, 24, 27, 32, 40, 48 and 72 hours after treatment administration. Area under the curve analyses revealed that the bioavailability of methionine was significantly greater when cows were treated with Smartamine M, when compared to prototype A and prototype B.

Presenter:	Carolyn Kennedy
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Adviser:	Nancy Whitehouse

Understanding the Division l Athlete's Understanding of Nutrition

Dominick Tavares, Kevin J. Pietro
Nutrition, UNH Durham

Introduction: Adequacy of nutritional knowledge is a major concern for Division l college athletes, especially because caloric needs are much higher than traditional non-athletes. Due to time constraints, it can be difficult for these athletes to consume a diet that meets their requirements that dramatically change routinely.
Aims: The aims of this study are: (1) Determine the relationship between sports nutrition knowledge scores and prevalence of risky behaviors in athletes and (2) Compare the ASNKQ scores between gender and team sports
Methods: Division l athletes (n=137) were recruited for this study. Participants were assessed on their sports nutrition knowledge through a validated questionnaire.
Results: A 75% score on the 35-question ASNKQ is considered adequate nutrition knowledge. The lowest score was 0%, the highest score was 74.2%, and the average score was 45.7%. 56% of athletes claimed that they consumed alcohol with the most common days of consumption being Friday & Saturday, and the most common source is Liquor 30-40% ABV.
Findings: Athletes with an ASNKQ score below the average (45.7%) were more likely to participate in binge drinking activities than athletes who scored above the average. The most common occurrences of binge drinking were Friday and Saturday.
Conclusion: Athletes with lower nutritional knowledge were more likely to participate in risky behaviors. Improved nutritional education and support should be an increased focus for athletic departments.

Presenter:	Dominick Tavares
Presenter's Major(s):	Nutrition
Year at UNH:	Senior
Research Interest:	Athletes and Sports Nutrition Knowledge
Adviser:	Kevin J. Pietro

Meta-Analytic Connectivity Modeling of Psychopathic Inmate and Non-Inmate Functional Brain Networks

Savannah Salvage, Donald Robin

Psychopathy is a personality disorder featuring deception and lack of empathy and remorse[1]. Overrepresented in forensic settings, psychopaths disproportionately commit violent crime and recidivate[1]. Research has found limbic and prefrontal changes in psychopathy, but functional brain network differences are not well understood[2]. We used activation likelihood estimation (ALE)[3] and meta-analytic connectivity modeling (MACM)[4] to compare functional networks in inmate and non-inmate psychopaths. We searched for functional magnetic resonance imaging studies of psychopaths. We encoded data from 25 papers and created experiment workspaces via Scribe and Sleuth [5]. We ran 3 ALEs: controls > psychopaths, non-inmate psychopaths > controls + inmate psychopaths, inmate psychopaths > controls + non-inmate psychopaths. We used MACM to determine functional connectivity between ALE regions[4]. MACM and ALE Analyses yielded distinct networks in inmate and non-inmate psychopaths. The non-inmate model is 5 co-activated regions in a highly interconnected network modulated by right anterior cingulate cortex. The inmate model shows two networks bridged by a projection from left posterior cingulate to right thalamus. Altered functional connectivity in social-cognitive and emotional networks of psychopaths may underly empathy and emotional control deficits and differ between subtypes.

Presenter:	Savannah Salvage
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Senior
Adviser:	Donald Robin

An Optimized Technique for Single Larva DNA Extraction to Observe MSX in Crassostrea virginica

Lauren Frances Welch[1], Bonnie Brown, Alyssa R Stasse[1]
[1]Department of Biological Sciences , UNH Durham
[2]Department of Biological Sciences, UNH Durham

Haplosporidium nelson agent causes the disease MSX in oysters and infects the gill epithelium and mantle tissue and eventually spread throughout the spat. The proliferation of Haplosporidium nelson will cause the epithelium layer of the gill to detach allowing the parasite to infect the circulatory system. As of now, there is no information on how MSX is transmitted but there is a developing hypothesis that it could potentially be a sexually transmitted infection. To investigate this hypothesis, the Department of Biological Sciences at the University of New Hampshire will use oyster samples from the Great Bay Estuary to investigate the best technique to extract single larva DNA.

The primary goal of this research is to investigate the best method of DNA extract from a single oyster larva. The overall goal is to be able to extract DNA from a single oyster to observe if MSX is present to eventually test the overall hypothesis that MSX could be sexually transmitted. To test this hypothesis three different methods are going to be tested to observe which technique is the most effective. The first technique was an isothermal amplification using a GenomiPhi kit. After diluting the amplified DNA extracted from the kit, the extracted DNA will be used for PCR. Another technique is Nested PCR where two rounds of PCR will be performed using two sets of primers. These samples are then observed using 2% Argos Gel or a Criterion gel.

Presenter:	Lauren Frances Welch
Presenter's Major(s):	Genetics
Year at UNH:	Senior
Research Interest:	Ecological genetics
Adviser:	Bonnie Brown
Adviser:	Alyssa R Stasse

Assessing Shifting Phytoplankton and Bacteria Population Abundances in Response to Environmental Instability

Rachel Lewis, Elizabeth Harvey
DBS, UNH Durham

Due to the nature of this ongoing project in conjunction with the University of Washington, a full abstract cannot be completed at this time. The following is a baseline first draft.

In order to understand the shifting ecologies of the ocean environment in response to modern stressors, one must first establish the mechanisms already at play. This study endeavors to investigate the changes in population abundances of phytoplankton and bacteria across varying timescales in response to shifting environmental parameters (temperature, salinity, etc.). Water samples were collected every four hours for two weeks off the shore of Orcas Island, WA (48.676455, -122.885175). Samples were analyzed using flow cytometry for the <15 um phytoplankton community, and the heterotrophic bacteria community. Diel patterns were observed, as well as larger patterns across longer time scales. INSERT RESULTS HERE. BASED ON RESULTS, understanding the way these communities change in response to their environment may help future scientists establish patterns to track the way the world's oceans are reacting to climate change. Future endeavors may look into these pattern changes over a longer period of time, or specifically the spring-to-summer bloom that this study seems to observe.

Presenter:	Rachel Lewis
Presenter's Major(s):	Marine, Estuarine and Freshwater Biology
Year at UNH:	Junior
Adviser:	Elizabeth Harvey

Arsenic in the Bolles Avian Collection: Developing a Best Practice for Handling Specimens Treated with Historical Taxidermy Methods

Caitlin Marie Borges, Janet Anderson

The Bolles Avian Collection located along the second floor of Spaulding Hall was gifted to the University of New Hampshire by the Runnels Memorial Hall and Chocorua Public Library in 1957, and hosts specimens collected between 1899 and 1902. Up until the 1980's arsenic and other metallic poisons were commonly used as a way of preventing insect devastation. Arsenic was applied in three main methods: dried powder, arsenic soaps, and liquid preservatives. In all cases, arsenic is able to bind to the keratin proteins of hair and feathers and deter pests as well as stop autolysis processes. However, arsenic has since been classified as toxic to humans and exposure should be limited. Research suggests that the presence of arsenic and other toxic chemicals are likely to be common-placed in many natural history collections. It is believed that mounted specimens such as those in the Bolle's collection have likely been treated with an arsenic soap, as such a qualitative analysis for arsenic must be conducted. A random sampling of approximately 10% of the collection were spot tested for arsenic using a modified Gutzeit Test. Through this method, any arsenic present will be agitated into a gaseous state which rises and reacts with filter paper that is coated with silver nitrate. Documenting the degree of arsenic present in the collection allows for a best practice to be developed for contaminated avian specimens to be cleaned, packed, and transferred.

Presenter: Caitlin Marie Borges

Presenter's Major(s): Sustainability, Zoology

Year at UNH: Senior

Adviser: Janet Anderson

Comparing the Performance of Glutamate Sensors with Conventional Electrophysiology *in Vitro* Using Hippocampal Slices

Vladimir Tkachev[3], Arturo Andrade[1], Edward Song[2]
[1]Carney Institute, Brown University
[2]Department of Electrical and Computer Engineering, UNH Durham
[3]Molecular, Cellular and Biomedical Sciences, UNH Durham

Glutamate is the most abundant excitatory neurotransmitter in the brain and a great number of neurons in the central nervous system use it to transmit electrical impulses. Most importantly, this neurotransmitter is involved in brain functions, such as learning and memory. Currently, in neuroscience research, there is a lack of techniques that efficiently measure glutamate concentrations. Recently, a templated polymer-based target receptor has been developed, and has proven to be able to directly and accurately measure the amounts of glutamate in solution using an electrochemical sensing technique. Our research focused on standardizing an effective biological system that could be used to assess the effectiveness of the glutamate sensor. To do this, we performed electrophysiological recordings of hippocampal mouse brain slices in Schaffer collaterals-CA1 synapses, which are well-known to release glutamate. In this part of the project, we successfully recorded field excitatory postsynaptic potentials, which are indicative of glutamate release from Schaffer collaterals-CA1 synapses. Our work has essentially prepared an efficient *in vitro* testing environment for the glutamate sensor and when it is ready to be applied in brain slices, our experiment will be used to aid its further development. Ultimately, if this sensor proves to be accurate and reliable, it will be used in numerous areas of neuroscience.

Presenter:	Vladimir Tkachev
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Senior
Research Interest:	Molecular and Cellular Neuroscience
Adviser:	Arturo Andrade
Adviser:	Edward Song

Elucidating the Role of Splice Variants for the Presynaptic N-Type Calcium Channel on Thermal and Mechanical Nociception

Vladimir Tkachev[3], Forest Miles MacKenzie[2], Arturo Andrade[1]
[1]Carney Institute, Brown University
[2]Department of Biological Sciences, UNH Durham
[3]Molecular, Cellular and Biomedical Sciences, UNH Durham

Nociceptors are neurons that detect noxious stimuli which trigger pain. In the terminals of nociceptors are presynaptic N-type calcium channels, where they control the release of neurotransmitters, thereby controlling transmission of pain. The gene that encodes N-type (CaV2.2) channels is Cacna1b and is alternatively spliced. Alternative splicing of the cassette exon 18a generates CaV2.2 splice variants with (+18a-CaV2.2) and without (D18a-CaV2.2). +18a-CaV2.2 splice variants allow for more calcium entry than D18a-CaV2.2 variants, thereby triggering more transmitter release. Both splice variants are expressed normally in nociceptors. We hypothesized +18a-CaV2.2 splice variants will enhance nociceptive responses compared to D18a-CaV2.2 variants. To test this, mice expressing either variant (+18a-only and D18a-only) were generated and their responses to mechanical and thermal stimuli were measured in normal and in inflammatory conditions. To induce inflammation, we administered Complete Freund's Adjuvant (CFA) in the hind paw. We found that mice expressing both splice variants (wild type) had similar responses to both thermal and mechanical stimulation than +18a-only and D18a-only mice in basal conditions and after treatment with CFA. Our results suggests that +18a-CaV2.2 and D18a-CaV2.2 splice variants play similar roles in thermal and mechanical nociception before and after inflammatory events. Thus, both splice variants can be targeted to treat pain.

Presenter:	Forest Miles MacKenzie
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Junior
Research Interest:	Neuroscience - Pain and Anxiety
Presenter:	Vladimir Tkachev
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Senior
Research Interest:	Molecular and Cellular Neuroscience
Adviser:	Arturo Andrade

Impacts of Sampling Gear on Stream Macroinvertebrates Observed

Sydney Mapley, Nathan B Furey

Stream macroinvertebrates play a key role in nutrient cycling because they process organic material and provide as prey for larger predators such as stream salmonids (Brook trout in New Hampshire). Many gear types are used to sample stream macroinvertebrates to determine the health of these systems, but it is possible that gear types can be biased towards specific taxonomic groups, influencing interpretations of results. To determine the impacts of gear type on stream macroinvertebrates observed, we used Surber samplers (which focuses on substrates, n=30) and drift nets (which captures drifting invertebrates, n=50) for collections in Garland Brook, New Hampshire between 6/25/2021–10/8/2021. Macroinvertebrates (n=1433 between the two sampling gears) were identified to Order and measured for length using a dissecting microscope. We observed differences in the frequency of occurrence of Orders between the two sampling methods. Surber samples had the highest concentration of Trichoptera (caddisflies) and Plecoptera (stoneflies) while Ephemeroptera (mayflies) concentration was very similar between the drift and Surber net samples, likely reflecting their microhabitat use. For example, caddisfly larvae build casings and are often found on the underside of cobble or boulders. Because these Orders in particular are indicative of stream health, researchers should recognize the taxa-specific biases between sampling methods.

Presenter: Sydney Mapley

Presenter's Major(s): Biology

Year at UNH: Senior

Adviser: Nathan B Furey

The Alterations of Gene Expression in the Cactus Mouse (Peromyscus eremicus) due to Dietary Changes

Christi Donatelli, Matthew MacManes
Molecular, Cellular, & Biomedical Sciences, UNH Durham

The alteration of gene expression within tissues can be an indicator of phenotypic changes which may be notable across a broad breadth of research. Here we characterize gene expression in the desert-adapted cactus mouse (*Peromyscus eremicus)* reared in a diurnal environment designed to simulate the natural desert environment to examine the role diet has on whole-organism performance. Changes in gene expression in tissues may aid in limiting water loss and could have an effect on total body water balance. These changes are monitored across tissue types and in both sexes fed a low fat diet or a standard diet. The liver, kidney, lung, hypothalamus, and GI tract were selected based on their use in metabolism and water homeostasis. The kidney and liver have been previously studied while the other tissues offer novel insights to gene expression within the species. By comparing the groups we will be able to identify genes controlling hydration status, organismal water economics, and biochemical changes. All animals rely on a combination of macronutrients to fuel metabolism and metabolic water production. As climate change increases desertification, water scarcity increases, and food sources change, the number of species that face challenges will increase. Animals living in desert environments are hypothesized to be genetically adapted to extreme temperatures and aridity and may bring greater understanding to the physiological traits required for life in such harsh conditions.

Presenter:	Christi Donatelli
Presenter's Major(s):	Biomedical Science
Year at UNH:	Junior
Research Interest:	*Peromyscus eremicus* transcriptomics
Adviser:	Matthew MacManes

Challenges and Barriers Associated with Food Security during COVID-19 among UNH Students

Sarah Waleryszak, Jesse Stabile Morrell
Nutrition, UNH Durham

Individuals across the United States have been faced with great financial hardship due to the coronavirus pandemic. This study focused on the barriers behind food insecurity among college students (18-24 years old) at the University of New Hampshire during the time of the pandemic. Students (n=16) were recruited from classes and campus organizations through email outreach during the summer of 2021. Food security status was collected through a self-reported demographic questionnaire and responses were scaled using the USDA Food 6-Item Insecurity Questionnaire. Focus groups were conducted via Zoom with groups of 2-5 students to understand the challenges students faced during the 2020-2021 school year as it pertained to food security and the challenges related to the pandemic. Focus group recordings were transcribed and participants' names were removed using the online Nvivo software, while Delve was used to find common themes in the discussion. One-quarter (25%) of participants experienced low food security. Through group discussion, students identified that access to wellness resources, allergy-friendly food availability, and dining hall related anxiety and stress as the primary topics of concern. This research has the potential to increase awareness and contribute to the development of effective and appropriate outreach techniques for food assistance programs.

Presenter:	Sarah Waleryszak
Presenter's Major(s):	Nutrition
Year at UNH:	Senior
Research Interest:	Food Insecurity and Covid-19
Adviser:	Jesse Stabile Morrell

Ovarian Cancer Treatment – Targeting STAT3

Jaxson R Libby[1], Sarah Walker[2]
[1]BMCB, UNH Durham
[2]MCBS, UNH Durham

Ovarian cancer is ranked the 5th most common cause of cancer deaths in women. Due to its difficult detection, many women will be diagnosed at a later stage. The more advanced stage the cancer is, recurrence rate increases and with that survival rate steeply drops. One way to try to combat the effects of ovarian cancer is to reduce the growth of a cancer spheroid. The transcription factor STAT3 contributes to many crucial survival mechanisms such as adhesion and proliferation as well as spheroid growth. We hypothesize that targeting STAT3 will specifically affect the spheroid which may restrict the cancer from being able to metastasize. Without these functions, spheroids will be unable to grow and reproduce which will reduce the tumor growth. This helps with reducing spreading and decreasing the chance of recurrence. A drug "cocktail" is often used to treat cancers to try to reduce growth but also used as an attempt to fully remove the disease. Often a single drug target will miss a few resistant cells, and the cancer will come back once the cells have grown up again. We were interested to determine if atovaquone, a drug used in the treatment of pneumocystis pneumonia that can also inhibit STAT3, affected 3D growth. By growing ovarian cancer cells in a 3D model to form spheroids, we found that atovaquone affected the spheroid size and growth. We are currently working to define the combinatorial effects of treating spheroids with atovaquone and chemotherapy agents.

Presenter:	Jaxson R Libby
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Junior
Research Interest:	Cancer
Adviser:	Sarah Walker

Sustainability in the New England Ski Industry

Sydney Elizabeth Gendreau[2], Cameron Wake, John Halstead[1]
[1]Environmental and Resource Economics, UNH Durham
[2]Natural Resources and the Environment, UNH Durham

The goal of this study is to determine whether or not sustainable investments are worthwhile for the New England ski industry. Research has shown that the New England ski industry will be greatly impacted by the effects of climate change within the near future. Climate change will cause frequent low snow winters, which have caused roughly $54 million in lost revenue for the New Hampshire ski industry in the past, increases in night time winter temperatures, and overall shorter winters. The economic impacts this will cause have been observed and projected. However, little research has been done on what ski mountains themselves can do to adapt to and mitigate these impacts. Due to the magnitude of my research question and short timeframe, I understand that this will only be the beginning of this research. I hope in this paper to identify key sustainability initiatives that have proven successful at New England ski resorts, as well as identify what consumers value when it comes to sustainable investments. This first question will be tackled by completing a case study on Jiminy Peak, a net zero ski mountain in Massachusetts that operates using onsite wind and solar power. The second question will be tackled by conducting an online survey with the UNH Ski and Board Club. It is my hope that this study will provide New England ski mountains with the knowledge needed to make educated, impactful investments that will allow their businesses to prosper into the future.

Presenter:	Sydney Elizabeth Gendreau
Presenter's Major(s):	Environmental and Resource Economics, Sustainability
Year at UNH:	Senior
Research Interest:	Sustainability in the New England Ski Industry
Adviser:	John Halstead
Adviser:	Cameron Wake

Impacts of Roads on Predator Presence in Southeastern New Hampshire

Lara Santos, Rem Moll
NREN, UNH Durham

Roads near natural areas can have harmful impacts on wildlife by restricting their movement and access to habitat. Roads cause habitat fragmentation, which can negatively impact wildlife fitness, reduce wildlife abundance and decrease species richness. Previous studies have focused on assessing whether animals can successfully cross roads or if roads act as a barrier to wildlife movement and overall connectivity. Here, we evaluated the effect of roads on the relative abundance of bobcats (*Lynx rufus*), coyotes (*Canis latrans*), fisher cats (*Pekania pennanti*), red foxes (*Vulpes vulpes*) and gray foxes (*Urocyon cinereoargenteus*) using 34 wildlife camera traps deployed throughout the University of New Hampshire woodlands. By using data collected from the camera traps and GIS analysis, I examined how distance from roads affect species of high conservation and ecological significance at each site. We detected species occurring more frequently at sites closer to roads (0-200m) than intermediate (200-400m) and far (400+m) sites. The findings from this research study show how predator abundance is affected by roads and demonstrate implications for how they might interact with roadways. This information can help guide future development decisions as roads can pose threats to local wildlife by blocking their movement and causing mortality through vehicle collisions.

Presenter:	Lara Santos
Presenter's Major(s):	Environmental Conservation and Sustainability
Year at UNH:	Senior
Research Interest:	Wildlife modeling and management
Adviser:	Rem Moll

The Novel Erythropoietin (EPO)-Regulated Adaptor Protein, "C1ORF186/RHEX", Modulates the EPO-Dependent Proliferation of Human Erythroid Progenitor Cells

Ari True, Don Wojchowski

The hormone, erythropoietin (EPO), functions to stimulate erythrocyte, red blood cell (RBC), development in bone marrow when it is released from the kidneys in response to anemia. “C1ORF186/RHEX” is a novel EPO adaptor protein located in the plasma membrane. RHEX is unique to humans and is essential for late-stage erythroblast development. Previous RHEX knockdown experiments resulted in halted cell growth, showing the importance of RHEX in erythrocyte development. A plasmid expression vector containing a tag to track the protein was constructed to overexpress wildtype (WT) RHEX in a gain of function (GOF) experiment but was unsuccessful. To find if this result was due to a RHEX overload or if the presence of the tag was influencing the function of RHEX, a new vector was developed to study the role RHEX plays in EPO signaling and the effects forced expression would have on cell growth. A lentivirus was constructed with the ability to both knockdown and rescue RHEX expression in UT-7 cells. Results were similar to the prior knockdown experiment. GOF RHEX with the new lentivirus vector resulted in decreased cell growth, supporting the idea that RHEX is a tightly regulated protein that works within a specific range to optimize function.

Presenter: Ari True

Presenter's Major(s): Biomedical Science

Year at UNH: Senior

Adviser: Don Wojchowski

The Effects of Estradiol on the Angiogenic Factor CCN1 in Human Tumor Granulosa Cells

Kiely Hoyt, Paul C Tsang, Donnelly Hutchings

Estradiol (E2) is produced by ovarian granulosa cells, and it regulates the reproductive cycle. It is also associated with cancers to promote angiogenesis or the process of new blood vessel formation. The angiogenic factor, vascular endothelial growth factor, is regulated by E2. In our lab, we found that the human tumor granulosa cell line, KGN, also expresses another angiogenic factor called cellular communication network factor 1 (CCN1). We wondered if E2 might affect CCN1 expression by KGN cells. Therefore, the objective was to determine the effect of E2 on CCN1 expression by KGN cells. In the present study, KGN cells were grown to confluency. Then, 6-well plates were seeded with 1 million cells per well. The KGN cells were either serum-starved for 2 or 24 hrs before treating with 400, 200, 100, and 50 ng/mL of E2 for 2 hours. After treatment with E2, RNA was extracted, complementary DNA (cDNA) was produced, and a quantitative polymerase chain reaction (qPCR) assay was performed. From this pilot experiment, in cells that were serum-starved for 2 hrs, there was an observed 200-fold increase in CCN1 expression for the 50 ng/mL E2 treatment compared to that of the 400 ng/mL E2 treatment. However, in cells that were serum-starved for 24 hrs, the 100 ng/mL E2 treatment appeared to have the highest CCN1 expression while the 50 ng/mL E2 treatment had the lowest. Additional replicates are needed to confirm these observations.

Presenter:	Kiely Hoyt
Presenter's Major(s):	Biomedical Science
Year at UNH:	Junior
Adviser:	Donnelly Hutchings
Adviser:	Paul C Tsang

The Four R's: A Framework to Evaluate the Environmental Impact of Environmental Research

Isabel Cole, Adam Wymore
Natural Resources , UNH Durham

Established legal frameworks and protocols exist that protect both human and animal subjects involved in research. Yet, there are few examples of protocols that are aimed at evaluating the effects of research on the environment. The goal of the Environmental Responsibility project is to provide a framework to guide environmental scientists to conduct environmentally-conscious research so that research can be conducted with the smallest environmental impact possible. This work draws on protocols such as the IACUC which is aimed to protect animal rights and the OHRP which provides regulations for human research subjects. The framework presented here provides four R's that researchers can use to evaluate and mitigate a project's environmental impact: recognition, replacement, refinement, and restoration. We present these 4 R's as an iterative process that can be implemented throughout the life of a research project. We provide examples of how this framework can be applied in both research and educational settings.

Presenter:	Isabel Cole
Presenter's Major(s):	Sustainable Agriculture and Food Systems
Year at UNH:	Sophomore
Research Interest:	Environmental Research
Adviser:	Adam Wymore

Does Prostaglandin F2alpha Have an Effect on the Expression of the Angiogenic Inducer, CCN1, in Tumor Ovarian Granulosa Cells?

Christopher Martinez, Paul C Tsang

Angiogenesis is the building and growth of new blood vessels, and this process requires vascular endothelial growth factor (VEGF) and cellular communication network factor 1 (CCN1), among other angiogenic proteins. In turn, the expression of these proteins is regulated by a variety of locally produced factors, including prostaglandins. Prostaglandins are a group of fatty acid derived compounds called eicosanoids. One of these prostaglandins is prostaglandin F2 alpha (PGF2a), which is a locally acting hormone. Previously, we reported that PGF2a stimulated CCN1 expression in ovarian luteal cells. Although the human tumor ovarian granulosa cells, KGN, synthesize CCN1, much needs to be learned about its regulation. Thus, the objective of the present study was to determine the effect of PGF2a on CCN1 expression by KGN cells. The KGN cells were grown to confluency in a 50:50 DMEM:Ham's F12 culture medium before they were seeded into 6-well plates at one million cells per well. The cells were serum-starved for two hours, followed by treatment with PGF2a (0.1, 0.5, and 1uM) for two hours. Gene expression of CCN1 and glyceraldehyde-3-phosphate dehydrogenase (GAPDH), a housekeeping gene, were determined by quantitative polymerase chain reaction (qPCR). In a pilot experiment, all concentrations of PGF2a appeared to increase CCN1 expression in KGN cells, when compared to controls. Additional replicates are needed to confirm this observation.

Presenter:	Christopher Martinez
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology, Biomedical Science
Year at UNH:	Senior
Research Interest:	Angiogensis
Adviser:	Paul C Tsang

Investigating the Roles of PRMT5-Mediated Epigenetic Regulations of RBPs and Histone

Evelyn Proctor, Madeleine Marie Clement, Reese Hunter Yeatman
Jingwei Cheng,
Molecular, Cellular, and Biomedical Sciences, UNH Durham

The general topic of this presentation is Merkel Cell Carcinoma (MCC) which is an aggressive form of neuroendocrine skin cancer. This cancer develops through a viral infection (80%) or from UV damage (20%). Specifically, we looked into the protein arginine methyltransferase 5 (PRMT5) which, during normal cell function, assists in cell survival and proliferation. We chose this topic because it is an understudied form of cancer that kills one in three people diagnosed. The specific problem that we are addressing is the increased expression of PRMT5 in MCC cells which could be a potential target for treatment. The objective of this research is to investigate the roles of PRMT5 mediated epigenetic modifications of RNA binding proteins and histones in MCC. Currently, we are addressing this problem by adding various doses of PRMT5 inhibitors to the MCC cell lines to see changes in cell viability. We are also investigating PRMT5 mediated posttranscriptional modifications of RNA-binding proteins by performing immunoprecipitation and Western blotting. Other tests we are conducting include RT-qPCR to test if PRMT5 inhibition changes RNA splicing and ChIP-qPCR to analyze PRMT5-mediated histone modifications at the promoters of oncogenes. This research will add to the scientific communities knowledge of potential treatment options in MCC. This research is part of Devya Gurung's graduate studies that the undergraduate students helped to carry out.

Presenter:	Evelyn Proctor
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Junior
Research Interest:	Merkel Cell Carcinoma
Presenter:	Madeleine Marie Clement
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Sophomore
Presenter:	Reese Hunter Yeatman
Presenter's Major(s):	Biomedical Science
Year at UNH:	Sophomore
Adviser:	Jingwei Cheng

Controls on Carbon Gas Fluxes from a Temperate Forest Soil

Natalie White[2], Ruth Varner[1]
[1]Department of Earth Sciences, UNH Durham
[2]Department of Earth Scienecs, UNH Durham

Forest soils consume atmospheric methane (CH4) serving as a major global CH4 sink that uptake an estimated 22 ± 12 Tg CH4 per year. Temperature and soil moisture have been identified as controls on the production and consumption of CH4 in forest soils. Climate-driven warming and changing moisture regimes may impact forest soils' role in the carbon cycle. Long-term monitoring sites can capture these changes over decades, leading to better predictions of CH4 exchange between the atmosphere and soils in the future.

This study utilizes a long-term trace gas dataset from a forest site to track both CH4 and carbon dioxide (CO2) fluxes throughout the period between 1989 and 2021. Monitoring of the forest site, located within College Woods in Durham, NH, began in 1989. Between 1989 and 2001 the collars were monitored approximately every two weeks. In June 2021 the site was re-established, and we collected weekly flux measurements at six total collars. Flux measurements collected June through October 2021 in College Woods indicated that average CH4 uptake in these soils across the six collars was 3.27 ± 1.16 mg m-² d-1. This is consistent with the 3.35 ± 1.68 mg m-² d-1 uptake rate observed June-October 1989-2001. Average COâ,, emissions between June and August 2021 were 2.86 ± 0.91 umol m-² s-1, also consistent with the 3.96 ± 2.36 umol m-² s-1 average for 1989-2001.

Presenter:	Natalie White
Presenter's Major(s):	Environmental Sciences
Year at UNH:	Senior
Research Interest:	Biogeochemistry
Adviser:	Ruth Varner

Mapping Landscape Connectivity for Conservation of the Endangered Blanding's Turtle in New Hampshire

Maeve Kelley[1], Jennifer Purrenhage[1], Rebecca Rowe[1]
[1]Natural Resources and the Environment (Wildlife & Con Bio), UNH Durham
[2]Natural Resources and the Environment, UNH Durham

Freshwater turtles are experiencing dramatic population declines due to human-caused stressors. Roads, in particular, have significantly increased turtle mortality rates through vehicle collisions. The Blanding's turtle (*Emydoidea blandingii*) is state endangered in New Hampshire and is listed as endangered on the IUCN Red List. Blanding's turtles are especially vulnerable to population declines because they reproduce late in life and their young have low survival rates. Adult Blanding's turtles migrate from ponds to upland habitats to nest and hatchlings must later travel across the landscape to reach ponds. These overland movements increase risk of vehicle collisions and predation. We assessed the degree of wetland connectivity for Blanding's turtles in southeastern New Hampshire. We used landcover resistance values derived from expert opinion data to map the degree of ease by which individuals can move between our six study ponds. We used Linkage Mapper within ArcGIS to identify least cost paths, pinch points, and centrality. Identification of pinch points allows us to prioritize areas for protection. We found that our study ponds are connected by suitable habitat, providing Blanding's turtles with a landscape that facilitates movement. Future studies can build on this work to identify potential pathways for range expansion into less-urbanized areas to the north and west of Strafford and Rockingham Counties.

Presenter:	Maeve Kelley
Presenter's Major(s):	Wildlife and Conservation Biology
Year at UNH:	Senior
Research Interest:	Endangered Blanding's Turtle Conservation
Adviser:	Jennifer Purrenhage
Adviser:	Rebecca Rowe

Potential Loss of Lysine from Various Rumen Protected Lysine Products When Mixed with a Total Mixed Ration

Sarah Fasanaro[1], Nancy Whitehouse[2]
[1]ANFS, UNH Durham
[2]COLSA, UNH Durham

Like all mammals, dairy cattle require amino acids, to use as building blocks to form proteins needed for normal body functions and milk production. Lysine and methionine are the two limiting essential amino acids in a cow's diet. Adding a high concentration of methionine or lysine to a diet does not guarantee that it will be absorbed by the small intestine. Because the microbiome of the rumen often degrades the amino acids before they can be used for protein synthesis, the amino acids are not being utilized by the body. The purpose of this study was to determine the bioavailability of three rumen-protected amino acid products: smartamine, lysigem, and ajipro. When incorporated into diets, essential amino acids can degrade. Each amino acid was exposed to an environment with a total mixed ration TMR sample in plastic bags. The TMR bags were incubated at zero, six, eighteen, and twenty-four hours. Each sample was then analyzed for potential loss of lysine and methionine to determine the bioavailability.

Presenter:	Sarah Fasanaro
Presenter's Major(s):	Animal Science
Year at UNH:	Senior
Research Interest:	Rumen protected amino acids
Adviser:	Nancy Whitehouse

Predation Driven Phenotypic Plasticity in a *Daphnia laevis* / *Chaoborus americanus* System

Em Irvine, Istvan Miko

Predator driven phenotypic plasticity is the ability of an organism to change its phenotype when exposed to a predator. The relationship between the cladoceran Daphnia and the larvae of the phantom midge Chaoborus is a model of this effect. Daphnia specimens experience instar specific head shape and tail spine modifications as a response to kairomones produced by the predator Chaoborus. Many species of Daphnia have been explored extensively, but we have no information on the impact of the presence of C. americanus on the uncommon species D. laevis. We examined the morphology of four Daphnia laevis instars that had been exposed to C. americanus in a natural environment using confocal laser scanning microscopy. Smaller specimens of D. laevis had a smaller body length to tail spine length ratio than larger specimens, with the longest tail spines occurring in medium sized instars that would be most susceptible to predation by Chaoborus. The tail spines also grew small hairs that were not present in the smallest specimens. This study provides baseline information for further investigations of defense responses of D. laevis to C. americanus, in which we explore the effects of C. americanus kairomones on cultured D. laevis populations.

Presenter: Em Irvine

Presenter's Major(s): Zoology

Year at UNH: Junior

Adviser: Istvan Miko

Relative Energy Content of Stream Macroinvertebrates and their Potential Value as a Food Source to Brook Trout

Olivia Marie Fortin, Secilya Evelyn Rose Williams, Nathan B Furey
Biological Sciences, UNH Durham

Stream macroinvertebrates are indicators of stream health and are a key food source for stream salmonids, such as brook trout (*Savelinus fontinalis*). The value of prey to their predators is dependent on their energy content which can be estimated by comparing quantitative measurements of the dry mass relative to their wet mass. Trichoptera (Caddisflies), Ephemeroptera (Mayflies), Plecoptera (Stoneflies), Diptera (True Flies), and Coleoptera (Aquatic Beetles) were sampled in Garland Brook, New Hampshire, using drift nets and Surber samplers. We predicted each Order would vary in its energy provided to brook trout. Microscopy was used to identify and measure the length of individual macroinvertebrates (n = 2343). In order to measure the relative energy content of macroinvertebrates, several members of each of the five orders were grouped, weighed, and placed in a drying oven until consistent dry weight measurements were obtained. Relative energy densities did indeed vary among the five Orders. In addition, total dry weight increased reliably with macroinvertebrate length. Our findings provided accurate estimates of the energetic quality of macroinvertebrates that can be used to determine the stream health of Garland Brook, New Hampshire, and potential habitat quality for brook trout.

Presenter:	Olivia Marie Fortin
Presenter's Major(s):	Zoology
Year at UNH:	Senior
Presenter:	Secilya Evelyn Rose Williams
Presenter's Major(s):	Wildlife and Conservation Biology
Year at UNH:	Sophomore
Research Interest:	Macroinvertebrates
Adviser:	Nathan B Furey

Screening Ocean Samples from Georgia for the Presence of MSX and Dermo Using PCR and qPCR Methods

Olivia M Williams, Elizabeth Harvey
Biology, UNH Durham

This Senior Thesis project aimed to be able to screen samples that came in from a PhD student in Georgia for the presence of two oyster diseases, MSX and Dermo. This study was done using PCR followed by visualizing on E-gels for initial presence of disease. These were then followed by qPCR and visualization on Criterion gels. These Criterion gels were able to be analyzed in order to calculate the pg/uL of MSX and Dermo in the original ocean samples. Since the samples were sent in over the course of February-August '21 the presence over time was also able to be tracked. It was shown that the diseases are either present in less high volumes or absent entirely in the earlier winter months, while increasing in rate all the way up through the summer. This showed that the diseases are mostly prevalent in the summer months. A direct comparison of the abundance of MSX vs. Dermo was also shown.

Presenter:	Olivia M Williams
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Marine Science/Genetics
Adviser:	Elizabeth Harvey

Processing Soil Cores from Adams Point in Durham, NH to See the Effect of TLP on the Salt Marsh

Delaney Jean, Gregg Moore
MEFB, UNH Durham

Salt marshes are an important ecosystem not only because of the organisms they support for but coastal protection. Salt marshes help protect coastal land from flooding and play a lot of important roles such as providing nutrients and organic materials to organisms. A previous study conducted in the Great Bay Estuary examined the effect of thin layer placement (TLP) of sediment on the above ground biomass of a degraded salt marsh at Adam's Point, Durham, New Hampshire. Building off that work, we sought to determine if TLP influences the belowground biomass in low marsh and high marsh habitats. Soil cores were obtained from treatments including a control (no action), a reference (healthy natural salt marsh), and sediment additions of 0, 7 and 14cm. These same plots were set up in both the high marsh and the low marsh. There was no significant difference found in the belowground biomass in the low marsh between the 7cm and 14cm treatment, whereas there was a significant difference in the high marsh between the 7cm treatment $\left(0.021 \pm \frac{0.0022g}{cm^3}\right)$and 14cm treatment $(0.012 \pm \frac{0.0023g}{cm^3}$, p=0.012). The sediment thickness did not seem to influence the belowground biomass in the low marsh but did in the high marsh. The ability of marsh plants to exploit new sediments with prolific root growth helps the marsh's stability, ability to grow marsh capital and has a potential to increase resilience against sea level rise.

Presenter:	Delaney Jean
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Junior
Adviser:	Gregg Moore

Integrative Studies on Photobehavior and Visual Physiology in *Pectinatella magnifica*

Stephen Walter Mrenna, David Plachetzki

Pectinatella magnifica is freshwater bryozoan whose young colonies are one of a few known examples of colonial movement in the phylum Bryozoa, or in any lineage of colonial animals. This ambulatory behavior has implications for the evolutionary history of Bryozoa and the current theory that Phylactolaemata is the earliest modern Bryozoan class. There is additional debate on whether this ambulatory behavior of colonial Bryozoans is a driven by phototaxis, which presumably is based on the expression of photosensitive opsin proteins. Here we describe observed observations of the movement ambulatory behavior of young *Pectinatella magnifica* colonies under different light conditions. We found a weak phototaxis behavior associated with red light and identified two potential avenues for movement. Next, we explored the opsins loci present in the genome of *Membarnipora membranacea*, a close relative of *Pectinatella magnifica*, where we recovered numerous opsins of the rhabdomeric class. We conclude that opsin likely mediate this intriguing photobehavior.

Presenter:	Stephen Walter Mrenna
Presenter's Major(s):	Marine, Estuarine and Freshwater Biology
Year at UNH:	Senior
Adviser:	David Plachetzki

Targeting the BCL6 Transcription Factor in Ovarian Cancer

Harrison Parent, Sarah Walker
MCBS, UNH Durham

Ovarian cancer is one of the most common reproductive malignancies for women in the United States, as well as one of the deadliest. Many deaths attributed to ovarian cancer are due to metastasis of the original tumor to different tissues throughout the body. The BCL6 transcription factor has been identified to play a key role in the metastasis of these tumors, as well as the invasion of these cancer cells through mesothelial cell layers, which contributes to ovarian cancer's unique metastatic behavior. In an attempt to target these metastases and prevent mesothelial penetration, drugs were identified as efficacious for BCL6 targeting through a mRNA transcript pattern screen from ovarian cancer cells treated with a BCL6 siRNA. Following identification of a small number of these compounds, 3-D cultured ovarian cancer cells were treated with these drugs to observe their effect on cell viability, spheroid formation, and mesothelial clearance through fluorescence microscopy. These data, coupled with intracellular protein expression and mRNA levels via qPCR and Western Blotting, provided both quantitative and qualitative methods of observing cancer cell response to novel and repurposed pharmaceutical treatments. The response of these cells, along with changes in the expression of BCL6 and its target genes, opens the door for future research into these compounds and treatment combinations that may be currently overlooked or unexplored.

Presenter:	Harrison Parent
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Senior
Research Interest:	Ovarian Cancer Treatment
Adviser:	Sarah Walker

Comparative Analysis of Dominant Halophyte Species' Percent Cover at Two Massachusetts Salt Marshes following Mosquito Ditch Remediation

Demetrius Alfred Phofolos, David Burdick
School of Marine Science and Ocean Engineering, UNH Durham

Ditching in New England salt marshes has been practiced for over a hundred years to reduce the population of *Ochlerotatus sollicitans*, the Eastern Salt Marsh Mosquito. While mosquito-reduction tactics have improved over the years, mosquito ditches in most New England salt marshes still remain, along with a host of other ecological consequences they cause, such as the change of dominant halophyte grass populations, Spartina alterniflora and Spartina patens. Due to excessive draining and oxidation of the porous marsh soil caused by ditching, a phenomenon called subsidence occurs where the marsh plain sinks over time. This causes more average tides to flood the marsh plain, where only the highest tides should. Because Spartina patens is less tolerant to flooding, subsidence causes an extending of Spartina alterniflora, which typically grows on creek edges and the lowest marsh plains. Ditch remediation, a process involving the damming of ditches with grasses mown on-site, has shown a reversion of these negative impacts in a select few New England salt marshes, including Nelson's Island in Newbury, MA (remediated in Fall 2014). This project seeks to expand the timeline of the aforementioned marshes, focusing on the change in Spartina alterniflora and Spartina patens from initial remediation to now. With a larger body of evidence showing the success of ditch remediation, a better case for getting rid of mosquito ditches altogether can be made.

Presenter:	Demetrius Alfred Phofolos
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Junior
Research Interest:	Coastal Wildlife and Ecology
Adviser:	David Burdick

Investigating the Effects of STAT3 as a Drug Target in Breast Cancer Cells

Samantha Emily Schultz[2], Sarah Walker[1]
[1]MCBS, UNH Durham
[2]Molecular, Cellular and Biomedical Science, UNH Durham

Approximately 287,850 women and 2,700 men in the United States will be diagnosed with either invasive or non-invasive breast cancer this year. A major characteristic of over 50% of breast cancer cells is the overexpression and constitutively active form of the transcription factor STAT3. STAT3 is involved in an extensive signaling pathway that involves its activation by phosphorylation and then directly effects the transcription of genes that control cell proliferation such as BCL6. Constitutively active STAT3 in breast cancer cells is known to bind the promoter of the BCL6 gene and over activate it which leads to unmanageable cell division and the formation of a tumor. Glycogen synthase kinase 3 beta (GSK3beta) is also theorized to directly increase the activity of STAT3, potentially through the phosphorylation of serine 727 on STAT3. A current antidiabetic and FDA approved drug called Rosiglitazone was identified as a potential STAT3 inhibitor through a computer based-screening program called Clue in the Walker lab. In this research, the effects of Rosiglitazone along with GSK3beta inhibitors Kenpaullone, TWS119 and SB216763 on the triple negative breast cancer cell line MDA-MB-231 were investigated through several experiments and techniques involving cell viability tests using CellTiter-Glo, western blots to examine gene expression levels to determine if STAT3 expression is decreased or inhibited after drug treatment, and qPCR to analyze the levels of expression of STAT3 target genes such as BCL6 and JunB after drug treatment.

Presenter:	Samantha Emily Schultz
Presenter's Major(s):	Genetics
Year at UNH:	Senior
Adviser:	Sarah Walker

Effects of Aging on the Reproductive Success of Female Saltmarsh Sparrows (Ammospiza caudacuta)

Isabella Collamati, Adrienne Kovach

The saltmarsh sparrow (*Ammospiza caudacutus*) is a ground-nesting specialist in coastal salt marshes of the Northeast. Rising sea-levels increase the loss of offspring due to tidal flooding, reducing nest success and resulting in a sharp population decline. In other avian species, age has been shown to affect nest success through altering fertility, behavior, and the number of young produced, favoring older individuals. I investigated age effects on nest success of female saltmarsh sparrows using nest monitoring data collected at two sites of a long-term demographic monitoring project: Chapman's Landing in Stratham, NH and Eldridge Marsh in Wells, ME. Reproductive success was measured categorically, based on whether a nest failed entirely or fledged at least one chick, and quantitatively, based on the number of chicks fledged per nest. The causes of failure (flooding or predation) were also observed. Female age was reconstructed using historical banding data. I predict that older females will have greater quantitative and qualitative reproductive success than younger individuals due to their higher experience level. Similarly, I predict that younger females will be more prone to flooding due to their inexperience. With increased understanding of the effects of aging on the reproductive success of saltmarsh sparrows, demographic surveys could better estimate fecundity and prioritize conserving populations with the greatest growth potential.

Presenter: Isabella Collamati

Presenter's Major(s): Wildlife and Conservation Biology

Year at UNH: Junior

Adviser: Adrienne Kovach

Impacts of Storm Events on Sediment Mobilization into Streams and Rivers

Alexander Searing[2], Wilfred Wollheim[1]
[1]WSAG, UNH Durham
[2]Water Systems Analysis Group, UNH Durham

Coastal marshes and tidal wetlands are important and delicate ecosystems, but the integrity of these systems is at risk due to increasing rates of sea level rise. The survival of these ecosystems is dependent on the deposition of sediments from watersheds to help counter the effects of erosion from wave action. Watershed sediments are released into rivers and streams during storm events, and those not deposited within the river system drain to coastal wetlands, where they are subsequently deposited on marsh platforms. This study explores the relationship between the magnitude of storm events and the quantity of sediments mobilized at the mouth of two coastal watersheds in Massachusetts, the Ipswich and Parker River watersheds. Our hypothesis states that an increase in stream discharge will result in an increase in total suspended sediment concentrations because of greater power (water velocity) to move sediments. Our results support the hypothesis, showing positive correlation between stream discharge and total suspended sediment concentrations. This research helps us to better understand a major mechanism by which coastal marshes and tidal wetlands may persist under rising rates of sea level rise, especially in the face of increased climate variability projected in the future.

Presenter:	Alexander Searing
Presenter's Major(s):	Environmental Sciences
Year at UNH:	Junior
Research Interest:	Freshwater systems
Adviser:	Wilfred Wollheim

Effects of HIF1α on Transcription Factor STAT3 in High Grade Serous Ovarian Cancer

Sarah Bourgoin[2], Sarah Walker[1],

[1]MCBS, UNH Durham
[2]Molecular, Cellular, and Biomedical Sciences, UNH Durham

STAT3 promotes various hallmarks of ovarian cancer including cell proliferation, invasion, and survival. Determining how STAT3 is activated will help to create treatments and discover drugs that can target specific areas of the STAT3 pathway. HIF1α is a transcription factor activated in hypoxic microenvironments. Ovarian cancer cell line OVCAR8 is known to produce hypoxic environments when grown in 3D culture. This project proposes that HIF1α is activating STAT3 through activation of a positive feedback loop. HIF1α activation is hypothesized to upregulate DEC1 which upregulates IL6R. In combination with JAK, IL6R phosphorylates STAT3. p-STAT3 can then promote DEC1 expression. Quantitative polymerase chain reaction (qPCR) and western blotting are being used to test the expression of both RNA and protein respectively. SiRNA transfections are being used to analyze the linkage between STAT3, HIF1α, and other genes believed to be involved in the pathway. Cell Titer Glo viability assays and EVOS imaging are being used on cells treated with both hypoxia inhibiting and promoting drugs to establish how cell survival is affected in both environments. The goal of this project is to determine the pathway between STAT3 and HIF1α in OVCAR8 cells. Understanding this pathway can benefit the current and future treatments of ovarian cancer.

Presenter:	Sarah Bourgoin
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Junior
Research Interest:	Cell Signaling and Cancer
Adviser:	Sarah Walker

Tracking and Identifying Sources of Bacterial Fecal Contamination in Northern New England; With an Emphasis on the Significance of Avian Sources

Olivia Deblois-Hill, Stephen Jones
Natural Resources and the Environment, UNH Durham

Information on sources and abundance of fecal-borne water contamination is essential for managing human health and safety risks in aquaculture and recreational waters. Routine monitoring of surface waters for contamination provides little information about sources, so strategies, termed “Microbial Source Tracking” (MST), have been developed to provide this information. This study was conducted to determine spatial and temporal trends for presence and relative concentrations of different contamination sources that occur within and between study areas across New England, with a focus on the Gulf of Maine and Long Island Sound. The targeted areas represent regional coastal areas with chronic and unresolved fecal contamination issues. We conducted PCR/qPCR-based MST analyses on DNA extracted from water samples with specific assays targeting specific contamination sources. Source-specific assays using PCR (presence/absence) included mammal, human, bird, gull, cow, horse and Canada Goose, and semi-quantitative qPCR (copy number concentrations) assays included mammal, human, and bird. The data were analyzed through a variety of mathematical and statistical methods. The results show spatial and temporal trends within and across study areas that reflect seasonal factors such as: water temperature, predation of enteric bacteria, UV light, and migration patterns of birds and humans. The trends help to frame how to conduct studies to identify and manage contamination sources. The focus on fecal contamination from birds is a focus because of the high frequency and variable levels of detection for these sources, and the related public health concern of these relatively ubiquitous bird sources. With climate change driven ecosystem changes, public health-related water quality issues continue to increase in significance as new pathogens emerge.

Presenter:	Olivia Deblois-Hill
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Microbial Source Tracking
Adviser:	Stephen Jones

Supplementation of Sodium Butyrate in Postweaned Limit-fed Heifer Diets: Effects on Coccidia Counts

Anna Sophia (Anna) Elizabeth Gray, Peter Erickson
ANFS, UNH Durham

In the dairy industry, raising replacement heifers presents a significant economic cost to dairy producers. Diseases like coccidiosis negatively impact the calf's health and feed efficiency, resulting in greater expenses for feed and treatments. Antibiotics and ionophores are used to treat coccidiosis and reduce the coccidia oocysts shedding in the feces. However, with the rise of antibiotic resistance and the ban on the use antibiotic-like growth promotors like ionophores by the European Union, a feed additive to replace these is becoming increasingly necessary. The objective of this study is to measure the effects of sodium butyrate supplementation in limit-fed heifer diets on coccidia oocyst incidence and rate in fecal samples. Twenty-four Holstein heifers were housed in a freestall barn, blocked by birthdate, and randomly assigned a treatment. Fecal coccidia counts were measured every other week during the 12-week trial. There was found to be no effect of the treatment of sodium butyrate on the incidence or the rate of coccidia oocysts in the fecal counts. However, there was found to be an effect on week animal was on in the study and coccidia incidence and rates.

Presenter:	Anna Sophia (Anna) Elizabeth Gray
Presenter's Major(s):	Animal Science
Year at UNH:	Senior
Research Interest:	Dairy Cattle Nutrition
Adviser:	Peter Erickson

Determining the Effectiveness of Adi-Flow on Natural Mixed Mycotoxin Contaminated Feed Fed to Lactating Dairy Cows

Samantha Lynch[1], Nancy Whitehouse[2],
[1]Agriculture, Nutrition, and Food Systems, UNH Durham
[2]COLSA, UNH Durham

Ingestion of mycotoxins by dairy cows can result in problems including decreased feed intake, production, fertility, and an impaired immune system. The objective of this study was to research the effectiveness of a mycotoxin deactivator on rumen, urine, and milk parameters when a natural mixed contamination feed is fed to lactating dairy cows. Twenty-four multiparous Holstein cows were randomly assigned to one of three experimental treatments in a randomized block design for 11 weeks. The experimental treatments were 1) DDGS with low mycotoxin load (Control), 2) DDGS with high mycotoxin load (DDGS), and 3) DDGS with high mycotoxin load + 30g/d Adi-flow (Adi). Milk samples were processed for true protein, fat, total solids, SCC, and MUN as well as for mycotoxin exposure. Urine samples were processed for allantoin, uric acid, and exposure to various mycotoxins. Rumen samples were processed for DNA sequencing, VFA analysis, and ammonia analysis. Significant effects in milk included a decrease in milk yield, lactose, milk yield: DMI, and SCC with an increase in fat. Significant effects in urine were an increase in insulin and a decrease in allantoin. Significant effects in rumen composition were a decrease in acetic: propionic acid. This study showed that contamination by mycotoxins can impair the function and composition of rumen, urine, and milk parameters. These parameters can be restored by a dietary mycotoxin deactivator to improve the health and performance of the cows.

Presenter:	Samantha Lynch
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Dairy cattle
Adviser:	Nancy Whitehouse

Relationship between α-Defensins, Gut Microbiome, and Glycemic Status in Bhutanese Refugees

Jason Hansen, Maria Carlota Dao, Sherman Bigornia
Agriculture, Nutrition, and Food Systems, UNH Durham

Rates of type 2 diabetes (T2D) are increasing and are disproportionately high among vulnerable populations. Multiple factors including poor diet and alteration of the gut microbiome may contribute to developing T2D. Further, T2D risk increases with chronic inflammation and disruption of the immune system. Defensins are a family of antimicrobial peptides produced by neutrophils, which are involved in innate immunity and inflammation. Recent literature has shown that α-Defensin 1(HDα1) may be involved in regulation of the microbiome and glycemic status, but further research is needed. This project will include 54 Bhutanese refugee adults living in New Hampshire, 38% of which have T2D. The relationship between HDα1, glycemic status, inflammation, and gut microbiota richness will be assessed. HDα1 will be measured with an electrochemiluminescence assay. This method is a type of serum based immuno assay that uses electricity to detect a SULFO-TAG antibody bound to the analyte in question. We hypothesize positive correlations between HDα1 and insulin sensitivity, and diet quality with negative correlations between T2D, inflammation, HbA1c, and neutrophil counts. This project is part of an ongoing study sponsored by UNH CIBBR. These findings will address significant gaps in our knowledge about diet, the gut microbiome, and human health and have potential future applications to medical improvements

Presenter:	Jason Hansen
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Human α-Defensin 1 and It's Role in Metabolic Health and Disease
Adviser:	Sherman Bigornia
Adviser:	Maria Carlota Dao

Determining the Effectiveness of Adi-Flow on Natural Mixed Mycotoxin Contaminated Feed Fed to Lactating Dairy Cows - Blood Constituents

Erica Oliver[1], Nancy Whitehouse[2],
[1]Agriculture, Nutrition and Food Systems, UNH Durham
[2]COLSA, UNH Durham

Ingestion of mycotoxins by dairy cows can result in problems including decreased feed intake, production, fertility, and an impaired immune system. The principal objective of this study was to research the effectiveness of a mycotoxin deactivator on blood parameters when a natural mixed contamination feed is fed to lactating dairy cows. Twenty-four multiparous Holstein cows were randomly assigned to one of three experimental treatments in a randomized block design for 11 weeks. The experimental treatments were 1) basal diet + distiller's grains with low mycotoxin load (Control), 2) basal diet + distiller's grains with high mycotoxin load (DDGS), and 3) basal diet + distiller's grains with high mycotoxin load + 30g/d Adi-flow (Adi). Blood samples were collected from the coccygeal vein at 1000h on the last three days of the covariate period and on weeks 2, 4, 6, 8, and 10. Samples were collected in 10mL evacuated tubes, 2mL vacutainer tubes, and 3mL serum separator vacutainer tubes. Tubes were cooled, spun, and prepared to ship in either -20C or -80C freezers for analysis. Blood samples were sent out for biochemical and hematological parameters. Significant effects were seen in phosphorus, which increased, and in white blood cell content which decreased. Phosphorus is essential in improving the reproductive performance of bovine, with no negative implications with a slight increase. WBCs are an indicator of underlying diseases or decreased immune response in the presence of infections. This specific study showed that with addition of a binder into a mycotoxin diet, blood composition of phosphorus and WBCs alter, which can increase their likelihood of getting pregnant and their likelihood for infections.

Presenter:	Erica Oliver
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Dairy cattle
Adviser:	Nancy Whitehouse

The N-Terminal Region of Cone Phosphodiesterase-6 Catalytic Subunits Enhances Dimerization of Its Regulatory Domains

Megan Tyler, Rick Cote

Photoreceptor phosphodiesterase (PDE6) is an enzyme in the retina that regulates the visual signaling pathway during vision. Cone photoreceptor PDE6 consists of two identical catalytic subunits, each containing two regulatory GAF domains, GAFa and GAFb. The N-terminal region preceding GAFa consists of 41 amino acids whose function is unknown. We hypothesize that these N-terminal amino acids contribute to dimerization of cone PDE6 subunits. To test this hypothesis, we recombinantly expressed and purified chicken cone PDE6 GAFab regulatory domains containing (GAFab1-458) or lacking (GAFab42-458) the N-terminal motif. Gel filtration chromatography (GFC) or chemical crosslinking followed by SDS-PAGE were used to assess dimer formation. At all concentrations tested, GAFab42-458 showed a single peak on GFC consistent with the monomeric state. Chemical crosslinking confirmed that GAFab42-458 exists primarily as a monomer. In contrast, GAFab1-458 demonstrated a single peak on GFC indicative of a mixture of monomers and dimers. Chemical crosslinking demonstrated that a majority of GAFab1-458 exists in the dimeric state at high protein concentrations. As GAFab1-458 concentration was lowered, the monomer-dimer equilibrium shifted to the monomeric state. These results support a role for the N-terminal motif in stabilizing dimer formation of cone PDE6 subunits, with implications for understanding how known human mutations in PDE6 may result in retinal degenerative diseases.

Presenter:	Megan Tyler
Presenter's Major(s):	Biomedical Science
Year at UNH:	Junior
Adviser:	Rick Cote

Identifying Individuals Vulnerable to Alcohol Abuse and their Endophenotype

Ethan O'Keefe, Hannah Elizabeth Manning, Sergios Charntikov
Psychology, UNH Durham

Alcoholism is defined as a chronic disease with environmental, genetic, and social factors impacting its development. The disease is characterized by drinking alcohol in the face of negative consequences and relapses into drinking despite periods of abstinence. Excessive alcohol consumption costs the U.S. approximately $294 billion a year in losses of productivity, motor vehicle crash costs, criminal activity fees, and health care fees. In the U.S., alcohol is the third most preventable cause of death, with an estimated 95,000 people dying from alcohol related causes annually. Despite extensive research into the addictive qualities of alcohol, treatment options are still only partially effective. We believe an efficient treatment approach would focus on identifying susceptible individuals who fit an addictive endophenotype and administering preventative measures. This study will take a novel approach to deriving that endophenotype by using a behavioral economics model to quantify economic demand for alcohol in rats. We hypothesize that the rats with high economic demand for ethanol will show persistence in the face of negative consequences. We also hypothesize that rats with high economic demand for alcohol will show a distinct c-FOS neurological profile compared to rats with low economic demand for alcohol. We will analyze this data at the individual and group level to further our understanding of the brain regions involved in alcohol addiction and relapse.

Presenter:	Ethan O'Keefe
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Senior
Research Interest:	Behavioral Neuroscience
Presenter:	Hannah Elizabeth Manning
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Behavioral Neuroscience
Adviser:	Sergios Charntikov

Landscaping with Native Plants: Are Private Landowners Interested?

Catherine A Taylor, Kelly Giraud
NREN, UNH Durham

Landowners may wish to see the benefits of restored ecosystem service functionality on their land or move away from introducing non-native or invasive species through common landscaping practices. However, it can be difficult to find information or locate native plants for landscaping purposes. Nonprofits such as Native Plant Trust, Rohdy Native Grow, Native Massachusetts, and The Coastal Maine Botanical Garden currently offer classes to educate landowners on how they can use their land to suit their own needs and benefit local ecosystems. This study aims to be informative for these organizations, helping them understand the characteristics of demand for their classes. During the summer of 2018, a total of 2,033 private land owners across the 6 New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) states completed an online survey regarding their land cover, past efforts and future willingness to restore wildlife habitat on their private land. The survey unveiled a diversity interest with respect to “landscaping for wildlife”. This paper investigates how demand for native plant class demand and class topic differ social attributes such as age and residential property location.

Presenter:	Catherine A Taylor
Presenter's Major(s):	Environmental and Resource Economics
Year at UNH:	Senior
Adviser:	Kelly Giraud

North Atlantic Right Whale (*Eubalaena glacialis*) Entanglement: A Scaled Model Simulation Offers Potential Mooring System Engineering Solutions

Lindsay Cartmell, Katie Womonausu Swenson, Alexis Jade McGarry, M. Robinson Swift, Mechanical Engineering, UNH Durham

In 2017, an unusual mortality event was officially declared for several marine species, including the North Atlantic Right Whale (NARW). The NARW population was already critically low, and continues to struggle primarily due to anthropogenic factors, most significant of which are vessel strikes and entanglement, the latter of which being the focus of this ocean capstone project (NOAA, https://www.fisheries.noaa.gov/species/north-atlantic-right-whale). With an aim to show complete prevention of entanglement in at least one scenario, a 1:45 scaled model was used to investigate the dynamics between a NARW and mooring systems, including with a slackline, a tensioned line, and a rod with bending stiffness. Entanglement occurred often in both the slack line and tensioned line mooring systems, and no entanglement occurred for the rod with bending stiffness. In all trials, the rod with bending stiffness prevented mooring system wrapping, the reason for entanglement, so the whale could collide and remain unentangled. Similar composite rods with bending stiffness may be engineered into mooring systems in order to move forward with marine projects requiring connection to the ocean bottom without the risk of whale entanglement.

NOAA. (n.d.) North Atlantic Right Whale. Species Directory. Retrieved March 12, 2022 from https://www.fisheries.noaa.gov/species/north-atlantic-right-whale

Presenter:	Lindsay Cartmell
Presenter's Major(s):	Biology
Year at UNH:	Senior
Presenter:	Katie Womonausu Swenson
Presenter's Major(s):	Ocean Engineering
Year at UNH:	Senior
Research Interest:	Acoustics
Presenter:	Alexis Jade McGarry
Presenter's Major(s):	Mechanical Engineering
Year at UNH:	Senior
Adviser:	M. Robinson Swift

Cyanobacteria Monitoring in Brackish Lakes Using Phycoerythrin, Phycocyanin and Size Fraction Analysis

Justine Colombo Cassel, James Haney
COLSA & COLA, UNH Durham

Cyanobacteria are toxic phytoplankton that pose risks to human health. Much cyanobacteria research has centered around the blue-green surface accumulations cyanobacteria can form in freshwater systems. However, cyanobacteria are also present in brackish and marine systems. Cyanobacteria are a diverse class of microbes that vary in size, pigment production and toxin production. To explore more precise methods of monitoring, the cyanobacterial pigments phycocyanin and phycoerythrin were measured from four different size fractions across three coastal lakes on Martha's Vineyard during the summer of 2021. Monitoring phycoerythrin in brackish systems has not been attempted previously. The size fractions analyzed in this study from smallest to largest are the dissolved size fraction, the less than 50-micron size fraction, whole lake water and bloom-forming cyanobacteria. Water quality parameters such as salinity and temperature were also taken. This study aims to answer the question of whether cyanobacteria pigments vary among size classes and do pigment trends among size classes vary with salinity. This information will aid in the formation of hypotheses about distribution of cyanobacteria in brackish systems and how to best monitor them.

Presenter:	Justine Colombo Cassel
Presenter's Major(s):	Marine, Estuarine and Freshwater Biology, Sustainability
Year at UNH:	Senior
Research Interest:	Sustainability, Cyanobacteria
Adviser:	James Haney

Allelic Exchange of *binK* in *Vibrio fischeri*

Brendan Deschenes, Cheryl Whistler

Differing ability of closely related *Vibrio fischeri* strains to form a mutualistic symbiosis with the Hawaiian bobtail squid, *Euprymna scolopes*, provides a model for studying bacterial colonization of eukaryotic hosts. Bacterial biofilm production, mainly in the form of symbiotic polysaccharide (Syp), is key for effective host colonization by protecting bacteria from host innate immune responses. In *V. fischeri* strain ES114, a native squid symbiont, the negative regulator BinK represses Syp production in culture but does not interfere with squid colonization. However, the *binK* sequence vastly differs between ES114 and close relatives such as the free-living strain H905 and the fish symbiont strain MJ11, suggesting that they have potentially evolved different functions to fit different ecological niches. This study aims to determine how strain-specific BinK proteins affect biofilm production, and ultimately squid colonization ability, when placed in the genetic background of a different strain. To do so, we have implemented several genetic techniques to swap the different *binK* genes between these three strains. Once the "hybrid" strains are produced, we will assess how biofilm production differs from the original "wildtype" strains to determine how evolutionary changes have altered this key symbiotic trait.

Presenter: Brendan Deschenes

Presenter's Major(s): Biomedical Science

Year at UNH: Senior

Adviser: Cheryl Whistler

Watching Conformational Changes of a Single Hemoglobin Upon Oxygen Binding

Valerie Giovina Pascetta[1], Krisztina Varga[2]
[1]Molecular, Cellular, & Biomedical Sciences, UNH Durham
[2]Molecular, Cellular, and Biomedical Sciences, UNH Durham

Almost all vertebrates use hemoglobin (Hb) to transport oxygen (O_2) from the lungs to the tissues via the bloodstream. To do so, Hb undergoes conformational changes that allow it to bind and release O_2. The O_2-bound R-state is slightly elongated compared to the deoxygenated T-state. Hb's conformational changes are essential to animal life, however, there is currently no published single-molecule data to characterize them. This study used a plasmonic optical tweezer consisting of a double nanohole (DNH) in gold film and an infrared laser to create optical hot spots. The enhanced electromagnetic field in the hot spots allows for trapping of nanoscale objects, such as single proteins, in an unmodified state. Hb's conformational changes were visualized in real-time by recording the light transmitted through the DNH and converting this signal to a digital trace via an avalanche photodiode. The transmission signal shifts in response to the polarizability of the substance inside the DNH, allowing the trap to capture a clear change in transmission between Hb's R and T states. Hb was first trapped in its deoxygenated form and was subsequently exposed to O_2 to monitor the shift from the T to the R state. T-state Hb showed a higher transmission signal with less fluctuation due to its lower polarizability. Once Hb bound O_2 and switched to its R-state, the transmission signal decreased and additional fluctuation due to increased molecular polarizability was observed.

Presenter:	Valerie Giovina Pascetta
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Senior
Research Interest:	Inhibition of Sars Cov-2 Mpro
Adviser:	Krisztina Varga

Targeting STAT3 in Triple Negative Breast Cancer

Emily Anne Pratt, Sarah Walker
MCBS, UNH Durham

Triple negative breast cancer (TNBC) is the most aggressive and lethal subtype of breast cancer, infamous for its chemoresistance and rate of recurrence. TNBC lacks the hormone receptors that are found in other types of breast cancer, and therefore the cancer cannot be treated with hormonal therapy. In addition to a poor prognosis, many TNBC patients experience recurrence of the cancer at secondary locations, which is often more lethal than the original tumor. The signal transducer and activator of transcription (STAT) pathway is relatively simple, acts quickly, and is a major contributor to cancer growth and metastasis. STAT3 is known to be constitutively active in TNBC and is a potential therapeutic target as it is associated with promoting proliferation, metastasis, and chemoresistance. The goal of my research is to repurpose drugs that have been approved by the FDA for other ailments that have the potential for inhibiting STAT3 activity in TNBC. I computationally screened for STAT3 inhibitors and have identified two potential drugs that work in a combination to inhibit cell viability. I hypothesize that if STAT3 is inhibited in TNBC cells, then the rates of proliferation will decrease, apoptosis will be promoted, and metastasis will be reduced. I am currently testing how these drugs affect metastasis, cell viability, and STAT3 activity. Importantly, this combination could potentially be used in future treatment of TNBC.

Presenter:	Emily Anne Pratt
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Junior
Research Interest:	Drug Discovery
Adviser:	Sarah Walker

Determining the Essentiality of Key Transcription Binding Proteins in *Toxoplasma gondii* Through the Tetracycline Off Inducible Knockdown System

Samantha Swartz, Vicki Jeffers

The protozoan pathogen *Toxoplasma gondii* is responsible for a prevalent chronic infection that makes up about a third of the world's population. In the absence of safe and effective treatments for this infection, new therapies are needed to protect against chronic infection in more susceptible groups like pregnant women and the immunocompromised. To identify and develop new treatments for Toxoplasmosis, it is vital to study the biological components of the parasite to detect various targets that are essential for parasite infection. The overall goal of the research in the Jeffers lab is to study gene regulation in *Toxoplasma* to identify essential proteins that are divergent from human proteins that could be targeted with small molecular inhibitors within *Toxoplasma*. One of the essential steps in regulation of gene expression is recognition and binding of transcriptional machinery to a gene promoter. In most eukaryotes, this step is mediated by the TATA box binding protein (TBP) that recognizes a TATA motif in the promoter and recruits the initiation complexes. Oddly enough, *Toxoplasma gondii* contains two TBPs yet no TATA boxes have yet been identified in parasite promoters, so it is unknown what exactly these TBPs binds to in the parasite to initiate transcription.

Presenter: Samantha Swartz

Presenter's Major(s): Genetics

Year at UNH: Senior

Research Interest: Toxoplasma gondii

Adviser: Vicki Jeffers

Diagnostics and Disease Surveillance of Managed New Hampshire Honey Bees (*Apis mellifera*) with Emphasis on Varroa destructor and Nosema spp.

Massle Lim Thach, Colleen F Monahan
Biomedical Sciences, UNH Durham

Pollinators, including honey bees (Apis mellifera), are crucial for food and economical security. Unfortunately, there are many threats to their survival, including climate change, pesticides, diseases, and crop monocultures. Varroa destructor (Varroa mite) is an ectoparasite that is one of the most serious contributors to colony decline and loss worldwide. These mites feed on the bee's fat body and transmit various viruses. Since the Food and Drug Administration's (FDA) 2017 Veterinary Feed Directive that classified honey bees as livestock animals, veterinary involvement and interest in of honey bee health has increased immensely. Managed honey bees from NH beekeepers were analyzed for Varroa destructor (Varroa mite)and, Nosema spp (N. apis, and N.osema ceranae) using established methods at the New Hampshire Veterinary Diagnostic Laboratory. The results were compared to established thresholds that guide treatment recommendations. The aim of this study is to develop diagnostic testing for common honey bee diseases at the NHVDL and compare results of initial testing to reported Varroa spp. and Nosema spp. prevalence levels of honey bee hives in New Hampshire, New England, and the United States. Disease surveillance is an important part of managing honey bee hives as it helps guide allows for proper treatment administration to optimize overall hive health.

Presenter:	Massle Lim Thach
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Honey Bee Health
Adviser:	Colleen F Monahan

Illuminating the Ancestry of Native American DNA Segments Using Genetic and "Paper Trail" Genealogy

Aidan Walsh[2], Thomas Davis[1]
[1]Agriculture, Nutrition, and Food Systems, UNH Durham
[2]Genetics, UNH Durham

Genetic genealogy is an up-and-coming career path for many who are interested in genetics and/or history. Its major use is in solving genealogical mysteries as well as identifying unidentified criminal suspects through their relationship to other genetic tested individuals. This study uses genetic genealogy techniques as well as traditional “paper-trail” genealogy to trace the origins of three DNA segments identified by two major testing companies (AncestryDNA and 23andMe) as being of Native American origin. In order to identify the origin of the three segments a map of the chromosomes must be made using genealogical data from the family trees of DNA matches to identify the ancestral individuals who passed down that segment of DNA. With enough genealogical data from matches it is possible to trace a single segment over many generations to a series of ancestors who possessed the same genetic signature at that given region. The results established that the three “Native American” DNA segments traced back to the tested individual’s 2nd great grandmother who was born in 1806 in Augusta County, Virginia. The second portion of this study is to examine the SNP (single nucleotide polymorphism) data within the three segments and illuminate the genetic contents of these regions. This is a very new and exciting science and one that has many unforeseen implications to the fields of genealogy, forensics, and genetics.

Presenter:	Aidan Walsh
Presenter's Major(s):	Genetics
Year at UNH:	Senior
Research Interest:	Genetic Genealogy
Adviser:	Thomas Davis

Natural Disease Suppressiveness of Wood Fiber Substrates

Bethany Bussey[1], Anissa Poleatewich[2]
[1]Plant Pathology, UNH Durham
[2]SAFS, UNH Durham

Most greenhouse growers use soilless substrates and peat moss as the common substrate for ornamental and vegetable crops. Increasing greenhouse production along with grower demand for sustainable substrates has contributed to a predicted 240% increase in demand for soilless substrates by 2050. Wood fiber substrates have been identified and utilized by growers as an alternative to meet demand and address shortages in peat. Before complete implementation of this product by the growers, it is important to identify the activity of plant pathogenic microbes in wood fiber substrates. The goal of this research was to address the gap in knowledge related to wood fiber substrate's disease suppressiveness using a *Rhizoctonia*-radish pathosystem. We evaluated three types of wood fiber substrates; Hammer-milled, Extruded, and Disc-refined and compared to peat. The experiment was conducted twice and consisted of 4 substrate treatments infested or non-infested with the pathogen. We hypothesized that wood substrates would be more disease suppressive than the peat control. We observed that damping-off disease severity was significantly less on plants grown in the Hammer-milled treatment compared to all other treatments. This research provides evidence that inclusion of wood substrates into a grower's substrate mix, may lessen disease risk. This research will help growers in the industry implement more sustainable practices in their own greenhouses with proper utilization of wood fibers.

Presenter:	Bethany Bussey
Presenter's Major(s):	Biomedical Science
Year at UNH:	Junior
Research Interest:	Sustainable Agriculture
Adviser:	Anissa Poleatewich

Analyzing Misinformation with Twitter

Katherine Grace Harpster, Sarah Creer, Laura Allen
LOL Lab, UNH Durham

Current media and political polarization have generated a misinformation crisis (Frenda, S. J., Nichols, R. M., & Loftus, E. F., 2011). Well definitions vary, generally misinformation involves the distribution of incorrect information that is intended to deceive the audience (Merriam-Webster, 2022). Importantly, misinformation can be characterized by different categories: satire/parody, false connection, misleading content, imposter content, false context, manipulated content, and fabricated content (Wardle, C., 2017). The current study was designed to explore how individuals' perceptions of misinformation accuracy may vary as a function of the category of misinformation present. Additionally, we examined how general prior knowledge and epistemological beliefs may influence these perceptions. To this end, participants (n=X) rated their perceived accuracy of statements generated to appear as if on Twitter. These statements included ten tweets from each category of misinformation and thirty factual tweets. Results will help specify what types of misinformation are the most challenging for individuals to discern from the truth and whether these perceptions are related to individual differences in knowledge and beliefs. Future studies will explore issues of sourcing and possible interventions to assist with misinformation identification.

Presenter:	Katherine Grace Harpster
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Freshman
Research Interest:	Misinformation
Adviser:	Laura Allen
Adviser:	Sarah Creer

Effect of Lake Air and Water Temperature on Toxic Aerosols

Alyssa Daigle, Katherine M Dennehy, Amanda McQuaid, Hailey Elizabeth Carter, James Haney
MEFB, UNH Durham

Toxins found within cyanobacteria in lakes have been linked to diseases including ALS, Alzheimer's, and liver disease. Recent findings have shown lake aerosols are a potential pathway of exposure to these cyanotoxins. Temperature has been proposed as a possible environmental control of aerosols, although this has not been tested under controlled conditions. This study tested the effect of temperature differential between water and air as an environmental driver of cyanobacterial aerosolization. The pigments phycoerythrin and phycocyanin found in cyanobacteria were used as proxies for cyanotoxins.

To test this temperature hypothesis, phycoerythrin (PE) was extracted from the cyanobacterium Spirulina and measured using a handheld fluorometer. Aerosols were measured in the lab using nine flasks with PE solutions held at three temperature treatments: room temperature (20C) warm (RT+10C), and cool RT-10C). A compact lake aerosol monitor (CLAM) was used to measure the aerosolized pigments. The CLAM pulls air from the flasks through a water trap (MilliQ) that collects the water-soluble pigment which was measured with fluorometry.

Rates of aerosolization in our controlled experiment were compared to the results of field estimates of aerosolization in lakes tested in ten New England lakes. Findings of our study are used to suggest conditions, such as seasons and time of day, where the greatest exposure to toxic lake aerosols might be expected.

Presenter:	Alyssa Daigle
Presenter's Major(s):	Environmental Conservation and Sustainability
Year at UNH:	Junior
Research Interest:	Lake Ecotoxicology
Presenter:	Katherine M Dennehy
Presenter's Major(s):	Biology
Year at UNH:	Junior
Research Interest:	Lake Ecotoxicology
Adviser:	Hailey Elizabeth Carter
Adviser:	James Haney
Adviser:	Amanda McQuaid

The Relationship Between Performance and Coloration in Eastern Red-backed Salamanders (*Plethodon cinereus*)

Sophia Zaslow, David Steinberg

Evolutionary ecologists have long been interested in understanding the forces that favor the persistence of extensive phenotypic variation in populations. The stable persistence of different traits could be driven by heterogeneous environments or frequency-dependent processes. Populations of the eastern red-backed salamander (Plethodon cinereus), across their range, are comprised of eight known color variants, with so-called lead-backed and striped morphs being the most common. However, the mechanisms by which these variants persist within the same population are still widely debated, with differences in predation pressure, dietary habit, thermal physiology, and metabolic rate each receiving varying degrees of support from empirical data. In this study, I explored the relationship between coloration and sprint speed in an effort to determine whether coloration might be linked to an ecologically-relevant performance trait . At three sites in New Hampshire, I measured the sprint speed of salamanders and photographed them for later digital quantification of various color parameters (intensity and hue). The results of this study will help inform future research examining the association of salamander coloration, performance, and physiology.

Presenter: Sophia Zaslow

Presenter's Major(s): Zoology

Year at UNH: Senior

Adviser: David Steinberg

Location, Location, Location: Common Tern (*Sterna hirundo*) Nest Site Selection in the Gulf of Maine

Ry M. Andruk, Elizabeth Craig, Aliya Everest Caldwell

When and where ground-nesting seabirds establish their nests can influence reproductive success. This is true of Common Terns (*Sterna hirundo*), which nest in dense coastal and island colonies and are threatened throughout much of their range. Studies have shown that earlier nest establishment dates correlate with higher reproductive success, suggesting that the most preferable nesting locations are chosen first. Older individuals may also select more preferable nesting sites than their younger, less experienced conspecifics, as terns are long-lived, have strong breeding site fidelity, and display a high degree of social learning over time. Our study aims to explore how metrics known to align with nesting success (namely nest establishment date and age) correlate with nest site characteristics. To do so, we collected data from 69 nests during the 2020 breeding season on Seavey Island, NH. We recorded nesting date and location, clutch size, parent age, nest site vegetation height, percent substrate cover, nesting density, nest cup size, and distance to colony edge. We explored these data for relationships between age, nesting date, and nest site metrics. Our results indicated the microhabitat characteristics that are preferable for Common Terns nesting at this site. Seavey Island is actively managed and our study will aid in conservation efforts by providing specific recommendations for habitat restoration targets.

Presenter: Ry M. Andruk

Presenter's Major(s): Wildlife and Conservation Biology

Year at UNH: Junior

Adviser: Aliya Everest Caldwell

Adviser: Elizabeth Craig

Root and Soil Carbon Responses to Long-term Warming

Maxim Desjardins, Serita Frey

Soils control global carbon(C) cycling through the storage of C in soil organic matter(SOM) and release of CO_2. Soils are likely to warm, risking sensitive soil C stocks. Plant roots are the main input of C belowground and increases soil C accumulation because their tissues are known to be recalcitrant. The focus of this research was to observe the effect of soil warming on root biomass and C and nitrogen(N) stocks. Soil samples were collected from the Barre Woods Soil Warming Study at the Harvard Forest Long-term Ecological Research(LTER) site. Soils were warmed +5°C above ambient soil temperatures for 19 years to study the feedback of a warmer climate on ecosystem scale processes. Samples were fractionated into particulate organic matter(POM), characterized by rapid decomposition rates and instability, and mineral associated organic matter(MAOM), the largest C retaining part of SOM with slow turnover, then analyzed for CN content. Roots were handpicked from soil and separated into absorptive and transport root biomass. Samples are currently being processed, but we expect that MAOM will be higher in heated plots due to it leading to an overall reduction in soil C. The MAOM fraction will be closely associated with transport roots, while the POM fraction will be closely associated with absorptive roots due to more N content of SOM. POM and MAOM will give information on how different soil CN pools are affected by root biomass and warming.

Presenter: Maxim Desjardins

Presenter's Major(s): Biology

Year at UNH: Senior

Adviser: Serita Frey

Interactions between *Emiliania huxleyi*, HHQ, and *Emiliani huxleyi* Virus

Marley Gonsalves, Elizabeth Harvey
Biological Science, UNH Durham

Marine microbes play an important role in mediating biogeochemical cycles of nutrients and transferring of carbon through marine food webs. Despite their importance, the mechanisms of interactions between microbes are often not well understood. Here, I investigate the interaction between a coccolithophore, *Emiliania huxleyi*, two strains of virus that infect the alga, and a quorum-sensing compound released by marine bacteria (2-heptyl-4-quinolone, HHQ). I conducted three experiments: (1) *E. huxleyi* was exposed to the virus and HHQ for an extended period of time; (2) *E. huxleyi* was exposed to viruses and dosing of HHQ was delayed; (3) added HHQ directly to the virus to look for degradation. I found that when *E. huxleyi* is exposed to HHQ, viral infection is prevented. There was no degradation of the virus with just HHQ exposure, and HHQ exposure had to happen within the first 4 hours of virus exposure to be effective. This study demonstrates the complex interactions between microbes in the ocean.

Presenter:	Marley Gonsalves
Presenter's Major(s):	Marine, Estuarine and Freshwater Biology, Sustainability
Year at UNH:	Junior
Research Interest:	Marine Microbes
Adviser:	Elizabeth Harvey

Population Structure and Dispersal of Prairie Warblers in the Central and Eastern United States

Alexa Aubrey, Brighid Rose Lamprey, Adrienne Kovach

Prairie warblers (*Setophaga discolor*) are shrubland habitat specialists of conservation concern due to reduction of available habitat and declining populations. Despite relying heavily on highly fragmented shrubland habitat, the species has high dispersal capabilities. High levels of dispersal could result in a well-connected population, or the species reliance on a declining and fragmented habitat could lead to multiple distinct populations. Previous studies of Prairie Warbler population structure in New Hampshire and Maine showed this species has low population structure, indicating high dispersal and gene flow among sampled locations. Leveraging samples from the previous study in Maine and New Hampshire (n=307), we compared individuals from populations in Arkansas (n=30), Massachusetts (n=30), and New York (n=30) to assess population structure at this larger geographic scale. We hypothesized we would find greater population structure at this larger geographic extent, with some sampled locations genetically distinct from one another. Starting with extracted DNA from blood samples, we amplified 11 microsatellite markers to get unique genotypes for all individuals. We used the resulting genotypes in population genetic analyses to test for population structure and extent of geneflow across the sites. Determining the number of distinct populations is important for planning the appropriate spatial scale of conservation efforts for Prairie Warblers.

Presenter: Alexa Aubrey

Presenter's Major(s): Genetics

Year at UNH: Junior

Presenter: Brighid Rose Lamprey

Presenter's Major(s): Genetics

Year at UNH: Junior

Adviser: Adrienne Kovach

The Accumulation of Anticoagulant Rodenticides in *Lynx rufus* from New Hampshire, New Jersey and New York, USA

Nadire Bek, Inga Sidor, David Needle

Rodenticides are chemical agents used to kill and reduce rodent populations. Commonly-used anticoagulant rodenticides (AR) disrupt the production of the active form of vitamin K, leading to a reduction of clotting factors and death by internal hemorrhage. Secondary AR toxicity occurs when dead or dying rodents are consumed by predator species, including bobcats. This project aims to assess the exposure to AR in free-ranging bobcats in the northeast US, and examine the geographic features associated with exposure. Roadkill bobcats (*Lynx rufus*) from New Hampshire, New Jersey, and New York were collected by state fish and game agencies for necropsy and sampling, and liver samples were screened for 10 ARs by high performance liquid chromatography. ARs were found in 31/85 bobcats from New Jersey, including diphacinone, brodifacoum, bromadiolone, and difethialone. These exposures were primarily seen in agricultural, urban, and forested regions. Data from New Hampshire and New York bobcats are pending. These findings may be useful to assess effects of AR exposure on bobcat populations and target regulation of AR use.

Presenter: Nadire Bek

Presenter's Major(s): Biomedical Science

Year at UNH: Senior

Adviser: David Needle

Adviser: Inga Sidor

A Molecular Source, Field-Based Approach to Assist Wastewater Management with Implications for Public Health

Trevor Louis Massey[1], Semra Aytur[2], John Bucci
[1]HMP, UNH Durham
[2]Health Management and Policy, UNH Durham

Human fecal contamination of surface waters can degrade aquatic ecology and increase the risk of waterborne illness with implications for public health. This case study demonstrates the use of molecular assays to detect human fecal DNA at points where a wastewater system renovation occurred a decade ago to prevent wastewater leaks into the College Brook on UNH Durham campus. The College Brook is a tributary of the Oyster River watershed, which is monitored for nutrient contamination. The objective was to demonstrate the combined use of three molecular source assays as a tool to assist the management of wastewater projects. Surface water samples (500 mL) were collected at designated sites in a transect upstream and downstream from the renovation location. Three different human specific assays (Bacteroidetes, mitochondrial, and somatic coliphage) were used to detect the presence of human fecal DNA in samples. A portable and bench-top real-time PCR platform was used to test the occurrence (presence/absence) of human fecal sources. Standard guidelines were followed including a lower detection limit of greater than 1 copy per 25 uL. Results demonstrate the utility of the combined use of host-specific, fecal DNA assays to manage wastewater contamination at its source. Next steps are to validate the field-based PCR platform as an additional monitoring tool to enable higher testing frequency.

Presenter:	Trevor Louis Massey
Presenter's Major(s):	Biological Sciences
Year at UNH:	Senior
Research Interest:	Water Quality, Public Health
Adviser:	Semra Aytur
Adviser:	John Bucci

Use of Hybrid Genes to Investigate the Function of Protein Phosphatase 2A in *Arabidopsis thaliana*

Ellie Hulit, Estelle Hrabak
Molecular, Cellular, and Biomedical Sciences, UNH Durham

In plants, Protein Phosphatase 2A (PP2A) regulates many processes, including response to stressful environments. PP2A has three subunits (A, B, and C) that interact to form a functional enzyme. In *Arabidopsis thaliana*, the A-subunit exists as three highly similar isoforms - A1, A2, and A3 - that appear to be ubiquitously expressed. A mutation that inactivates the *A1* gene causes root cells to change shape when exposed to salt stress indicating that PP2A normally helps maintain root cell shape. In an *a1* mutant, roots curl when seedlings are grown on an agar surface containing NaCl. Previous experiments showed that introduction of the *A2* gene partially complemented the *a1* mutant phenotype. Due to the high similarity between the A1 and A2 subunits, we hypothesized that these subunits have some functional redundancy but that differences in expression resulted in partial complementation. To test this hypothesis, hybrid genes with the promoter of one subunit and the coding region of another were transformed into *a1* mutant plants. A standardized root assay was used to measure root curling and PCR was used to detect the hybrid gene. Preliminary results indicate that *a1* mutants transformed with the *A2::A1* hybrid gene show partial complementation of the root curling phenotype, while *a1* mutants transformed with the *A1::A2* hybrid gene show full complementation. If confirmed, these results will support our hypothesis that these A subunit isoforms are functionally interchangeable.

Presenter:	Ellie Hulit
Presenter's Major(s):	Genetics
Year at UNH:	Junior
Research Interest:	Plant Genetics
Adviser:	Estelle Hrabak

Analyzing Differences in Functional Connectivity in Veterans with Mild Traumatic Brain Injuries Using Graph Theory Metrics

Jessica M Leach, Amy Ramage
Communication Sciences and Disorders, UNH Durham

Mild Traumatic Brain Injury (mTBI) has been known to be a silent epidemic as a result of the condition showing no signs in clinical neuroimaging diagnosis techniques. Symptoms are associated with poorer rates of return to productivity. It is important to investigate effects on brain tissue in mTBI veterans to discover any differences in brain connectivity that could ultimately be the cause of cognitive control deficits. This was measured using graph theory metrics of modularity to assess dynamic functional changes during a task with changing effort levels. There were 61 subjects with TBI during deployment and 42 orthopedic controls. Participants squeezed a pneumatic bulb to a prescribed effort level (25%, 50% or 75% of maximal effort level) and held effort constant for 30 seconds followed by 30 seconds of rest. fMRI data was preprocessed, and the time blocks were split into first and second halves to address time on task (TOT). Modularity (Q) was calculated for each subject using BOLD signals for each effort level. Qualitative analysis was done to address the module partition link brain networks. The only significant group difference for the variation in Q with effort level/TOT was for the 1st half of the 75% effort level (Blast mTBI = non-blast mTBI > Control, $p < .005$).â€¯Data suggests that TBI subjects have altered connectivity in regions that are important for cognitive control.

Presenter:	Jessica M Leach
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Senior
Research Interest:	Functional Connectivity Differences in Veterans
Adviser:	Amy Ramage

Breast Cancer Treatment - Targeting Transcription Factors

Michael John Lawson, Sarah Walker
MCBS, UNH Durham

Female breast cancer is the 2nd leading cause of cancer death in females and is the 4th most deadly cancer by number of deaths, regardless of gender. The wide range of forms female breast cancer can exist in all pose unique issues in terms of severity and treatment. One variation of the disease, triple negative breast cancer (TNBC), lacks three vital properties that are often characteristic of female breast cancers, estrogen receptors (ER), progesterone receptors (PR) and the protein HER2, which all exist as common treatment targets when present. TNBC makes up ~15% of female breast cancer cases and is defined by its higher rates of growth and metastasis, which both serve to lower survival outlook of those affected. In response to the limitations of treatment posed by TNBC, we were interested in identifying and exploring potential alternative targets, a primary candidate being transcription factors (TFs) involved in vital cell signaling pathways. The relationship between TF activity and breast cancer cells was explored using viability assays, as well as RNA and protein production. We found multiple instances of large viability decreases in response to drug treatments. We will continue to explore combinatorial effects of drugs, as well as introducing new drugs altogether.

Presenter:	Michael John Lawson
Presenter's Major(s):	Biochemistry, Molecular and Cellular Biology
Year at UNH:	Junior
Adviser:	Sarah Walker

Evaluating Dispersal Behavior in White-tailed Deer

Stuart James Mackersie, Rem Moll

Dispersal is characterized by animals leaving their home range and establishing a new range. In cervids, the primary reason for young males to disperse is to avoid inbreeding by moving away from closely related individuals and reducing competition for mates by moving into habitats with lower densities of conspecifics. However, it is suggested that resource availability also plays a role in the probability of dispersal. In this study, we analyzed data from GPS-collared white-tailed deer (*Odocoileus virginianus*) from three study sites in Missouri. We manually determined the dispersal start and end date in QGIS and estimated a 95% minimum convex polygon for each deer to establish what its original and new home ranges were. We defined dispersal distance as the distance between the median points of each range. 97 out of the 575 deer dispersed from their home range and 6 deer dispersed twice before they settled down. The mean distance of dispersal was 11,585.08 km with a standard deviation of 22,701.09 km. A few exceptionally long dispersals skewed this as the median distance of dispersal was 6,551.624 km. Of interest were deer that ventured into their future home ranges months in advance, possibly scouting the area before committing to dispersal. Understanding white-tailed deer population dynamics and dispersal is of critical importance due to the threat of chronic wasting disease and predicting its future spread.

Presenter: Stuart James Mackersie

Presenter's Major(s): Zoology

Year at UNH: Senior

Adviser: Rem Moll

When Communities Collide: Investigating How Active Layer And Permafrost Microbes May Interact In A Changing Arctic Climate

Julie Bobyock[1], Jessica Ernakovich[2]
[1]Natural Resources and Environment (NREN), UNH Durham
[2]Natural Resources and the Environment, UNH Durham

Permafrost, or permanently frozen soil, is thawing due to warming air and soil temperatures in the Arctic. Permafrost soil is underlain by an active layer that experiences seasonal freeze-thaw cycles. Both permafrost and the active layer contain large stores of frozen organic matter, which can be decomposed by microorganisms upon thaw. The microbiome and soil characteristics of permafrost and the active layer are necessary to investigate, given that microbial decomposition produces greenhouse gases that can accelerate global warming. Previous studies have shown that when permafrost thaws, microbial communities can shift to resemble the active layer, but little is known about how this affects microbial respiration rates. In this project, active layer soil was introduced to thawed permafrost soil at varying degrees via a series of diluted active layer soil slurries. The inoculation occurred prior to a three-week thaw incubation to investigate the effect of emerging active layer microbial communities in permafrost, and the resultant impacts on carbon dioxide production. We expect permafrost samples with stronger active layer slurry dilutions to resemble more change and higher decomposition rates. Understanding how active layer and permafrost microbial communities interact to influence greenhouse gas release and community composition can provide insight into future microbial ecology and carbon cycling as climate continues to change.

Presenter:	Julie Bobyock
Presenter's Major(s):	Environmental Sciences
Year at UNH:	Junior
Research Interest:	Permafrost Thaw
Adviser:	Jessica Ernakovich
Adviser:	Joy O'Brien
Adviser:	Nate Blais
Adviser:	Lukas Bernhardt
Adviser:	Tom Douglas

Influence of Surface Tension on Production of Toxic Aerosols

Abigail Jeanne Ferreira, Mitchell George Norris, James Haney
Center for Freshwater Biology, UNH Durham

Cyanobacteria are photosynthetic prokaryotes found in freshwater ecosystems. They produce aerosolized toxins such as ß-methylamino-L-alanine and microcystins linked to a variety of neurodegenerative and liver diseases. Environmental factors can impact rates of toxins released into the air, but these mechanisms are poorly understood. The goal of this study is to examine water surface tension as a regulator of aerosol emissions.

We designed a device to determine relative surface tension for water samples containing Spirulina powder and various concentrations of surfactant. Surfactant reduces surface tension, allowing its manipulation as an independent variable. After preparation of water samples and surface tension testing, to quantify these aerosolization rates, the accessory pigment phycoerythrin was used as a proxy. Compact Lake Aerosol Monitors were used to collect aerosolized phycoerythrin which were analyzed with a fluorometer. We hypothesized that as surface tension decreases, the amount of aerosols released increases exponentially. Linear regression analysis was used to test for relationships between aerosolization and surface tension.

Residents in Cape Cod and Martha's Vineyard noticed more frequent cases of diseases related to cyanobacterial toxins compared to less aquatic areas. Identifying factors that impact aerosolization may help limit exposure by educating the public about when the risk is greatest.

Presenter:	Abigail Jeanne Ferreira
Presenter's Major(s):	Neuroscience and Behavior
Year at UNH:	Freshman
Presenter:	Mitchell George Norris
Presenter's Major(s):	Marine, Estuarine and Freshwater Biology
Year at UNH:	Junior
Research Interest:	Freshwater biology
Adviser:	James Haney

Anticoagulant Rodenticide Accumulation in Free-Ranging Fishers (*Pekania pennanti*) from Maine, USA

Cheyenne Rose Elliott, David Needle

20g of liver from 106 fishers trapped in the state of Maine were sent to the Pennsylvania Animal Diagnostic Lab New Bolton Center for an anticoagulant screen. The anticoagulant screen was done through LC/MS technology. Liquid Chromatography/Mass Spectrometry allows the sample to be separated into components and introduced to the mass spectrometer, which creates and detects charged ions. This anticoagulant screen tested for Brodifacoum, Bromadiolone, Chlorophacinone, Coumachlor, Coumafuryl, Difenacoum, Difethialone, Diphacinone, Pindone,Valone, and Warfarin. In the 106 samples, Brodifacoum, Bromadiolone, Dicoumarol, Difenacoum, and Diphacinone were detected. 56 of 106 fishers were positive for rodenticide exposure. 31 fishers were positive for Brodifacoum, 11 positive for Bromadiolone, 11 positive for Dicoumarol, 11 positive for Difenacoum, and 26 positive for Diphacinone. 27 of 106 were infected with 1 rodenticide with 29 being infected with 2 or more. The distribution of positive cases across the state of Maine was widespread. Large numbers of positive cases were found in many of the same townships.

Presenter: Cheyenne Rose Elliott

Presenter's Major(s): Animal Science

Year at UNH: Senior

Adviser: David Needle

Influence of Reducing Tomato Fruit Load on Fruit Size, Quality and Yield

Caterina Roman, Rebecca Sideman
NHAES, UNH Durham

Tomato is a high value crop that is commonly grown in plastic high tunnel structures. Many growers use indeterminate fruiting varieties since they have a prolonged harvest period. To maximize yields, pruning of indeterminate varieties is critical. While growers commonly remove lateral shoots (suckers), less is known about pruning fruiting clusters. Prior research has shown that reducing the number of fruit per cluster increases fruit size but has generally not shown increases in yield. We hypothesized that reducing fruit load by removing some clusters and/or limiting the fruit load on each cluster, would improve overall fruit quality, consistency of fruit production over time, and total yield. In this study, we had five treatments: a control with full fruit set, reducing clusters to 3 or 6 fruit per cluster, and removing alternate clusters as well as reducing remaining clusters to 3 or 6 fruit per cluster. The most severe fruit pruning (removing every other cluster, 3 fruit/cluster) increased the individual fruit weight but also increased the amount of unmarketable fruit whereas, control plants and plants with minimal pruning (all clusters, 6 fruit/cluster) had the smallest fruit but the highest marketable yield. The more aggressive the pruning strategy, the greater the plant's vegetative growth was, however, this wasn't correlated with greater yields. Further research is needed to determine the ideal amount of fruit removal as well as its effect on different cultivars.

Presenter:	Caterina Roman
Presenter's Major(s):	Sustainable Agriculture and Food Systems
Year at UNH:	Senior
Research Interest:	Sustainable vegetable production
Adviser:	Rebecca Sideman

Exploring the Impact of COVID-19 on Food Security among New Hampshire Communities

Laura Lynch, Jesse Stabile Morrell
Nutrition, UNH Durham

As an ongoing global health and socioeconomic crisis, the COVID-19 pandemic is considered an example of an influential disruptive factor (IDF) as it has disrupted the finances, health, and food access to countless individuals and families. An increase of food insecure individuals and families requiring assistance programs has arisen consequently. The objective of this research project was to explore the various areas where the COVID-19 pandemic has impacted food security status within the state of New Hampshire (NH).

A survey collecting demographics and assessing food security was distributed to community stakeholders (n=11; 100% female; 72.7% white) across NH. Focus groups (n=2) were conducted and recorded, with qualitative data transcribed, coded, and analyzed. Results from this research concluded that communities adapted to COVID-19 precautions by shifting modalities for work, education, and socialization. However, mental health, socialization, and physical activity levels decreased, and low-income community members suffered disproportionately. Capacity and service reductions for public transportation, homeless shelters, soup kitchens, food pantries, and churches were of consequence. These discoveries suggest that assistance programs may benefit from increases for donation healthfulness and diversity, partnerships, and event organization efforts to better prepare and serve its low-income community for future IDFs.

Presenter:	Laura Lynch
Presenter's Major(s):	Nutrition
Year at UNH:	Recent Graduate
Research Interest:	Food Insecurity
Adviser:	Jesse Stabile Morrell

Using Social Media for Animal Advocacy Toolkit

Audrey Sharp, Vanessa Grunkemeyer

The goal of this research project is to create an Animal Advocacy Social Media Toolkit that specifically focuses on how social media can be utilized to effectively advocate for animal welfare. A critical review of relevant literature, identification of techniques applied in existing animal advocacy social media, and interviews of industry experts and Animal Science undergraduates were conducted. The gathered information was synthesized into a toolkit that highlights aspects of important language, effective strategies, the use of different platforms, and how working with social media supports advocacy efforts and extends to broader social injustice issues. The outcome of this is to create a resource that can be utilized to more effectively highlight experiences such as UNH CREAM and PEEP through social media and as an educational tool for the general public to clear a path for discourse on animal rights.

Presenter:	Audrey Sharp
Presenter's Major(s):	Animal Science
Year at UNH:	Junior
Research Interest:	Animal Advocacy
Adviser:	Vanessa Grunkemeyer

Glaucoma in Dogs

Shayla Grace Callahan, Inga Sidor

Glaucoma is the syndrome of abnormally increased intraocular pressure resulting from incomplete or inefficient drainage of aqueous humor. Glaucoma can be primary or secondary to other causes, including trauma, inflammation, and tumors. One form of primary glaucoma in dogs is goniodysgenesis. In this syndrome, the anterior chamber of the eye is not completely developed and the drainage angle is compromised. This occurs in many dogs, but appears inherited in some breeds. The benefit of recognizing this disease early is to direct treatment to prevent it in the other eye which can result in complete blindness. In this study we wanted to examine a claim in the literature that goniodysgenesis cannot be diagnosed microscopically, but rather requires clinical gonioscopy. This project compiled all the glaucoma cases submitted to the New Hampshire Veterinary Diagnostic Lab from the past 5 years. We microscopically assessed three categories of glaucoma: primary goniodysgenesis, secondary glaucoma, chronic glaucoma of undetermined cause, with a healthy eye as a control. Features of eyes with goniodysgenesis were further examined. In our limited case series, we did not observe breed predispositions for goniodysgenesis.

Presenter: Shayla Grace Callahan

Presenter's Major(s): Biomedical Science

Year at UNH: Senior

Adviser: Inga Sidor

Comprehensive Avian Pathology Results of Zoo New England Submissions to the New Hampshire Veterinary Diagnostic Laboratory (2011-2021)

Kiara Muca, Colleen F Monahan

A retrospective review of avian submissions from Zoo New England (ZNE) to the New Hampshire Veterinary Diagnostic Laboratory (NHVDL) was conducted to determine trends in disease processes and mortality in these populations. ZNE is a non-profit organization that oversees the activity of the Franklin Park Zoo and Stone Zoo in Massachusetts. Cases (n=189) consisted of surgical biopsy and postmortem submissions over a 10-year period and included birds from 16 different avian classes, with some taxonomy unknown. The primary morphologic diagnosis from each case was categorized into eight general disease processes. Results showed inflammatory (unknown cause or noninfectious origin) (32.28%) to be most common followed by unknown cause of death (12.7%), neoplastic (11.64%), inflammatory (bacterial) (11.11%), metabolic (10.05%), inflammatory (parasitic) (7.41%), trauma (6.88%), and inflammatory (fungal) (5.82%). The aim of this study is to identify disease trends based on class, species, and/or shared habitats.

Presenter: Kiara Muca

Presenter's Major(s): Biomedical Science

Year at UNH: Senior

Adviser: Colleen F Monahan

Impact of Drought Stress on Oak Stomatal Size and Density at Thompson Farm, NH

Emily Chen, Heidi Asbjornsen

Global climate change is likely to affect Northeastern U.S. forests by increasing the frequency and severity of drought events. Historically, droughts rarely occurred in this region, so native tree species are not well-adapted to extreme moisture stress. In recent years, the changing climate has caused unprecedented levels of low water availability which may have implications on future forest composition. It is hypothesized that trees can respond to these environmental changes by altering their functional traits, also referred to as phenotypic plasticity, for example, by producing leaves with fewer and smaller stomata. To determine the capacity to which oak trees adjust their functional leaf traits in response to water stress, stomatal size and density were measured in Northern red oak (*Quercus rubra)*, white oak (*Q. alba)*, and black oak *(Q. velutina*) using leaves collected in 2020 and 2021 from the UNH Thompson Farm DroughtNet experiment. Imprints of each leaf were made with clear nail polish, mounted on slides, and examined under a light microscope. Images taken from these slides were then counted and measured using ImageJ software. Preliminary results show that both stomatal size and density values were lower in 2021 than 2020. No significant differences were found between drought and control treatments in the same species. Variation existed between individual trees of the same species and within different leaves of the same tree.

Presenter: Emily Chen

Presenter's Major(s): Environmental Sciences

Year at UNH: Senior

Adviser: Heidi Asbjornsen

Looking at the Effects of M0-, M1- and M2-polarized Macrophages on Waldenstroem Macroglobulinemia Cell Viability and Proliferation

Anna Metzler[2], Sherine Elsawa[1]
[1]Molecular, Cellular, & Biomedical Sciences, UNH Durham
[2]Molecular, Cellular, and Biomedical Sciences, UNH Durham

The tumor microenvironment (TME) is composed of cancer cells, surrounding blood vessels, immune cells, signaling molecules, and cytokines. The composition of the TME has an influence on tumor growth due to close interaction between non-cancerous and cancerous cells. Waldenström macroglobulinemia (WM) is a non-Hodgkin's B-cell lymphoma that is characterized by an abnormal increase in IgM production by plasma B-cells. Macrophages are innate immune cells that function as phagocytes and bridge the gap between adaptive and innate immunity by stimulating T-cell activation. Tumor-associated macrophages (TAMs) exhibit a variety of polarization states, ranging from pro-inflammatory M1 cells, to anti-inflammatory M2 cells. These can subsequently be identified as anti-tumor M1 macrophages or tumor-supporting M2-polarized macrophages. We investigated the effects of macrophage polarization states on Waldenström Macroglobulinemia (WM) cell viability and proliferation.

Presenter:	Anna Metzler
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Tumor microenvironment of WaldenstrÃ¶m Macroglobulinemia
Adviser:	Sherine Elsawa

Prevalence of Vaping and the Association with Cardiometabolic Risk in College Students

Brittney Rose Nalesnik, Jesse Stabile Morrell
Agriculture, Nutrition, and Food Systems, UNH Durham

Vaping is a growing public health concern; however, most reported prevalence rates have only focused on youth. The purpose of this study was to investigate prevalence rates among undergraduates (18–24 years) and examine differences in cardiometabolic parameters between vapers and non-vapers. Students (n= 267) were recruited from an introductory nutrition course during Fall 2021 to participate in the College Health and Nutrition Assessment Survey. Prevalence data were collected through a self-reported wellness survey. More than half (55.1%) reported ever vaping. During the past 3 months, 7.9% reported zero use, 18.4% 1x/2x, 3.4% monthly, 10.5% weekly, and 15.0% daily/almost daily; 12.7% of students had a strong desire or urge to vape daily/almost daily. There were no differences in cardiometabolic assessments between males according to vaping status except for lower systolic blood pressure (SBP) between infrequent vapers vs. never/former vapers (115.4±8.5 vs. 123.6±14.1, $p<.05$). For females, BMI was higher in infrequent vs. never/former vapers (23.8±3.5 vs. 22.1±3.9, $p<.05$), waist circumference was larger in infrequent vs. regular and never/former vapers (82.3±9.9 vs. 78.1±11.3 and 76.9±7.0, respectively, $p<.05$), and SBP was lower in regular vapers vs. infrequent vapers and never/former vapers (107.1±9.4 vs. 112.3±8.6 and 111.1±10.1, respectively, $p<.05$). These results further our understanding of vaping prevalence and cardiometabolic differences in college students.

Presenter:	Brittney Rose Nalesnik
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Research Interest:	Health Sciences
Adviser:	Jesse Stabile Morrell

Determining Plasma Methionine or Lysine Concentrations for Lactating Holsteins Supplemented With 12 g/d and 24 g/d of Methionine from Infusion or a RP-Met Supplements Using the In Vivo Plasma Dose-Response Method

Rachael Girroir, Nancy Whitehouse
COLSA, UNH Durham

The objective of this trial was to determine the bioavailability of a rumen protected methionine supplement using the plasma AA dose response method. 5x5 Latin square with seven-day experimental periods using ten multiparous lactating, ruminally canulated Holstein cows varying in days in milk were conducted to determine the bioavailability of the RP-Met supplement Kessent M2. Five experimental treatments were used; 0g/d Met (negative control), 12 g/d of abomasally infused Met, 24 g/d of abomasally infused Met, 12 g/d of fed Met (20 g/d Kessent M2) and 24 g/d fed Met (40 g/d Kessent M2). All cows in the study were fed the same basal diet that was balanced to be Lys-adequate but Met deficient and was prepared three times a day. Blood samples were obtained from each cow four times a day on the last three days of the covariate period and the last three days of the experimental periods. These samples were prepared so that deproteinized plasma could later have plasma AA analysis performed. Milk samples from each cow were taken twice daily on the last three days of the covariate period and the last three days of the experimental periods and analyzed for true protein, fat, lactose and MUN. Total milk yield on these days was also recorded for each cow. Treatment was found to have no effect on dry matter intake, milk yield or on the milk properties that were analyzed. Of the five sulfur containing amino acids, treatment was found to have a statically significant effect on methionine, cystathionine, taurine and TSAA. The bioavailability of RP-Met in Kessent M2 was found to be 72.6 ± 1.0.

Presenter:	Rachael Girroir
Presenter's Major(s):	Animal Science
Year at UNH:	Senior
Research Interest:	Dairy Nutrition
Adviser:	Nancy Whitehouse

Evolutionary Novelties in the Male Terminalia of Mining Bees (*Hymenoptera: Andrenidae)*

Charles Staff, Istvan Miko

Andrenidae is one of the largest bee families with 3,295 described species. They are important pollinators in both natural and agricultural systems. The andrenid male terminalia (the male genitalia with the genital opening and additional, modified abdominal segments that are involved in copulation/insemination) play a crucial role in species diagnosis and have a potentially high phylogenetic significance. Based on preliminary observations of the exoskeleton on a limited number of andrenid genera, the complexity of the male genitalia and the number and structure of the additional abdominal segments vary widely between genera. While the male genitalia is more complex and the number of modified apical segments are fewer in the primitive *Andrenidae*, the male genitalia is simplified and the number of segments involved in copulation increases in derived Panurginae, likely representing a key evolutionary novelty that led to the diversification of this subfamily. In this comparative study, we explore the skeletomuscular system of the male terminalia in six tribes of Andrenid bees using confocal laser scanning microscopy. These methods will provide unprecedented insight into the functional drivers of the negative correlation between male genitalia and apical abdominal complexities. Our findings will provide the link between structure and function, and will enable us to find a potential reason for this evolutionary trend.

Presenter:	Charles Staff
Presenter's Major(s):	Zoology
Year at UNH:	Senior
Research Interest:	Entomology
Adviser:	Istvan Miko

Genetic Diversity of Free-ranging Fishers (*Pekania pennanti*) in the Northeastern United States

David Needle, Natalie Smith

Fisher (*Pekania pennanti*) reintroduction became necessary after European settlement after severe population decline secondary to logging and anthropogenic activities by the 1900s. Population diversity has been an open question over the ensuing decades. We have collected samples from New Hampshire, Maine, New York, Rhode Island and Vermont to assess genetic diversity in their native populations. The study set includes 381 individuals from prior harvests dating back to 2017. We will assess diversity via mitochondrial cytochrome b, as well as 10 microsatellite loci that were identified in a previous study by Schwartz (2007). Following PCR, sequencing will proceed with the Illumina NovaSeq 6000. Relatedness will be determined between individuals and across the landscape. This project should demonstrate regions of relatively high and low diversity and geneflow, which could include anthropogenic and natural bottlenecks.

Presenter:	Natalie Smith
Presenter's Major(s):	Biomedical Science
Year at UNH:	Senior
Adviser:	David Needle

Assessing Controls of Methane and Carbon Dioxide Emissions from a Temperate Reservoir

Ruth Varner, Angelica Marie Dziurzynski
Department of Earth Sciences, UNH Durham

Inland waters are a globally significant source of methane (CH_4) and carbon dioxide (CO_2) emissions to the atmosphere. Due to climate forcing, temperature and productivity levels are increasing in inland waters, which may also increase greenhouse gas emissions from these waters. The interaction of physical and biological factors controlling aquatic emissions could potentially drive positive feedback loops, influencing aquatic greenhouse gas emissions as the climate continues to warm. In this study, we measured CH_4 and CO_2 emissions using floating chambers and bubble traps, water temperature, pH, aquatic vegetation percent cover, and dissolved organic carbon (DOC) concentrations across a depth gradient at the Old Durham Reservoir in Durham, New Hampshire to assess potential drivers of aquatic trace gas emissions. An aerial survey was also conducted and the results were used to scale ebullitive CH_4 fluxes across the reservoir. It was found that net and ebullitive CH_4 fluxes increased as depth decreased, but this depth trend was not found for net CO_2 fluxes. Differences in CH_4 and CO_2 fluxes between depth sites may be impacted by differences in vegetation cover. These results further our understanding of CH_4 and CO_2 emissions from reservoirs as the climate continues to warm.

Presenter:	Angelica Marie Dziurzynski
Presenter's Major(s):	Earth Sciences, Marine, Estuarine and Freshwater Biology
Year at UNH:	Senior
Research Interest:	Biogeochemistry
Adviser:	Ruth Varner

The Effect of Forest Degradation on the Population Distribution of Mammals in the Bartlett Experimental Forest, New Hampshire

Suzannah G Buzzell, Rem Moll

Logging activities are the main cause of forest degradation, which occurs when economically valuable tree species are selectively harvested while lower value species, like American beech (*Fagus grandifolia*), remain unharvested. While the economic effects of such activities are clear, we lack an understanding of how such forest degradation influences the wildlife species that inhabit such forests. To investigate this issue, we deployed 34 wildlife cameras placed at sites across forest stands that varied in degradation level in the Bartlett Experimental Forest, located within the White Mountain National Forest of New Hampshire. We used the resultant image data from these cameras to estimate the relative abundance of several mammal species: *Ursus americanus, Alces alces, Pekania pennanti*, and others. We then used linear models in the Program R to test the hypothesis that forest degradation would negatively affect mammal population densities. We found that there were generally more detections of mammals in areas less degraded relative to areas that were considered most degraded. Overall, we concluded that there is a difference of mammalian density across areas of various degradation levels, particularly in mammals of the families *Cervidae*, *Ursidae,* and *Mustelidae*, and forest degradation does impact the wildlife population density and composition.

Presenter: Suzannah G Buzzell

Presenter's Major(s): Wildlife and Conservation Biology

Year at UNH: Junior

Adviser: Rem Moll

Microplastics in the Hampton-Seabrook Estuary: Analyzing Trends and Comparing Methodologies in Sample Collection

Catherine Wardinski, Gregg Moore, Hanna Mogensen
MEFB, UNH Durham

Microplastics have been found in every major marine environment. Understanding sources of input and microplastic trends within these habitats is important for managing healthy ecosystems. While many studies are being done to obtain baseline knowledge of microplastic presence and abundance, the variability across sampling and lab methodologies makes it difficult to compare findings and understand overall trends. Additionally, traditional sampling protocol requires expensive equipment and limits accessibility. Through comparing two microplastic field sampling methodologies, we looked to gain critical information on the microplastic presence, trends, and best practices of analysis. Water samples were collected by both a 333-micron manta trawl net and through 1-liter grab samples between July-September 2021 in the Hampton-Seabrook Estuary. Both types of samples were chemically digested and filtered on a 5-micron PTFE filter. Samples were co-stained with Nile Red and DAPI, and run under a confocal microscope to determine microplastic counts and particle size. Results from this project will inform the current projects going on in the Moore Lab by determining if the current sample collection methodologies are accurately describing the microplastics in the HSE and exploring more accessible microplastics sampling pathways.

Presenter:	Catherine Wardinski
Presenter's Major(s):	Marine, Estuarine and Freshwater Biology, Sustainability
Year at UNH:	Senior
Adviser:	Hanna Mogensen
Adviser:	Gregg Moore

Inactivation of Corticostriatal Pathway and Connections to Associative Learning through Nicotine Stimulus in Sprague Dawley Rats

Karina Babina, Sergios Charntikov

It has been supported that the corticostriatal pathway (CP) can be pharmacologically manipulated to inhibit accumulated associative learning. The neurons that span throughout this pathway network have been shown to be involved with associative learning mechanisms. In this study, nicotine was used as a non-contingent stimulus. Surgery targeted both regions of the brain so that DREADDs (Designer Receptors Exclusively Activated by Designer Drugs) were injected into the prefrontal cortex (PFC) and posterior dorsomedial caudate-putamen (p-dmCPU) as an indicative measure to study if inactivating the corticostriatal pathway directly inhibited goal-tracking behavior in Sprague Dawley rats. Rats were trained progressively to press for rewards from initial water training to sucrose dippers that would administer intravenous nicotine stimulus. Clozapine-N-oxide (CNO) was then injected subcutaneously to target DREADDs. Correct placement of DREADDs in the p-dmCPU and PFC were confirmed via confocal microscopy. Goal-tracking behaviors were inhibited, and our hypothesis was supported. Further research is needed to support evidence on goal-tracking inhibition, but this study can shed light on neural addiction mechanisms in humans.

Presenter: Karina Babina

Presenter's Major(s): Biomedical Science

Year at UNH: Senior

Adviser: Sergios Charntikov

The Effect of Post Meal Walking On Daytime Blood Pressure in Young Adult Women

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Post-meal walking (PMW) performed after breakfast, lunch, and dinner has been demonstrated to reduce blood glucose. However, no studies have examined the potential additive benefits of post-meal walking exercise on daytime central blood pressure (BP) in young women. **METHODS:** Thirteen physically inactive, non-hypertensive women (Age: 20±1 years; percent body fat: 28.2±13%) completed the study during the early follicular or placebo phase of their contraceptive cycle. Participants completed a control day (CON; no exercise/excess physical activity) and PMW day (3 bouts x 15 minutes of brisk walking) over five days in random order. Daytime ambulatory BP and accelerometry data (to estimate METs) were measured and compared. **RESULTS:** PMW increased metabolic expenditure (PMW= 35.8±1.44 vs. CON= 33.7±0.94 METs, $p<0.05$). Daytime central blood pressure trended to increase or was increased on the PMW day compared to the control day (Central Systolic BP: PWM= 104±8 vs. CON= 101±9 mmHg, $p=0.054$; Central Diastolic BP: PWM= 73±6.5 vs. CON= 70±7 mmHg, $p<0.05$; Central Mean BP: PWM= 88±8 vs. CON= 85±8 mmHg, $p<0.05$). PMW also increased daytime heart rate (PWM= 85±7. vs. CON= 80±5 bpm, $p<0.05$). Further, a median split based on adiposity did not lead to any meaningful reductions in daytime central BP ($p>0.05$ for all). **CONCLUSION:** PMW does not lead to reductions in central BP in young, physically inactive women.

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