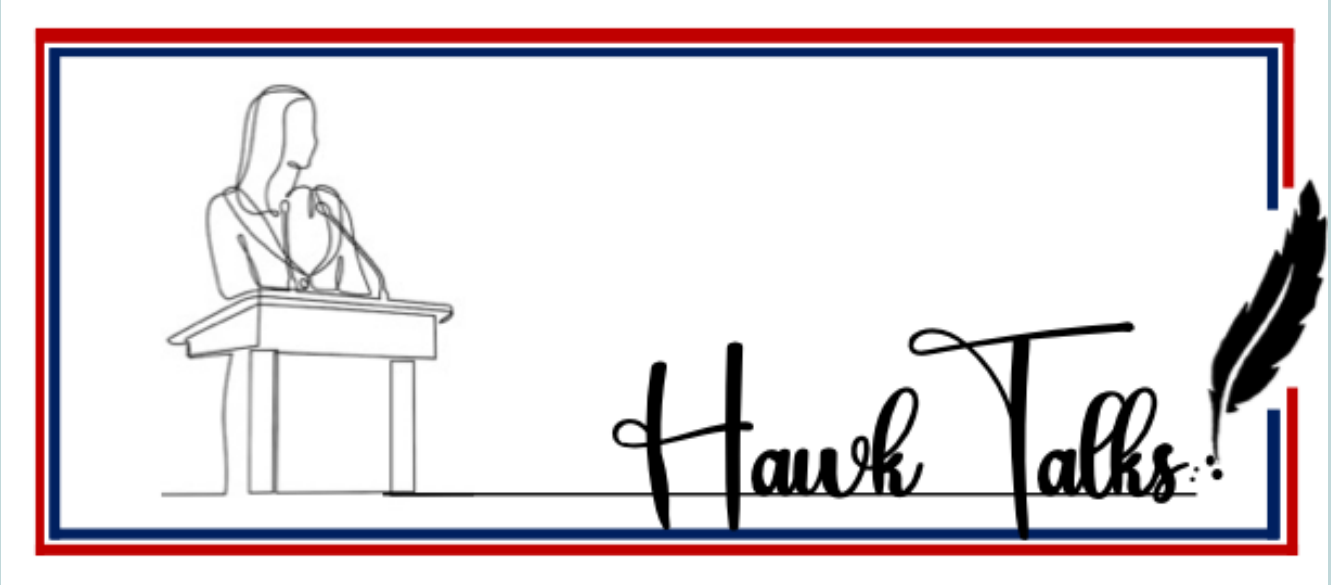
Proceedings of the
2024

Hawk Talks



26 April 2024
1:00pm – 3:30pm

KU Edwards Campus
12600 S Quivira Rd
Overland Park, KS 66213

Hawk Talks

Welcome to the 2024 Hawk Talks Conference. This conference features work from students representing a diverse range of programs, including Applied Biological Sciences, Exercise Science, Health Sciences, Environmental Science, Psychology, and Biotechnology. The Hawk Talks Conference is an opportunity for students to present year-end capstone, honors, and independent research projects. The agenda of talks and poster presentations are on pages four and five. Abstracts and short biographies appear in the remaining pages organized by the order of the talks. These are followed by the abstracts and bios of our poster presentations.

Hawk Talks provides a platform for student researchers to come together and share their latest findings and discoveries. This convention serves as a means to stay up-to-date with the latest research taking place on the University of Kansas' Edwards Campus. We hope that you enjoy the presentations and engage in the Q&A sessions following each.

Whether you are attending as a presenter, in support of a presenter, an industry representative, or for any other reason, your presence is greatly appreciated and we hope that you find the work to be interesting and that it inspires further discussion and collaboration among all attendees. We would like to thank all the student researchers who have contributed to this conference and commend them for their exceptional work.

The University of Kansas Edwards Campus Biotechnology Program would like to thank the

Johnson County Research and Education Triangle

for its support

Agenda

1:00pm – 1:25pm Welcome and Introductions

Regence Center 110

Stuart Day, PhD
Vice Provost, Edwards Campus

Alex Williams, PhD
Director, Psychology

Brendan Mattingly, PhD
Director, Applied Biological Sciences

Melissa Daggett, PhD
Instructor and Lab Manager, Applied Biological Sciences

Anna Pope, PhD
Asst. Teaching Professor, Psychology

Scott Schulte, PhD
Assoc. Professor of Practice, Environmental Studies

Terri Woodburn, PhD
Director, Environmental Assessment

Ashley Kalatusha
KUEC Honors Liaison

Ashley Herda, PhD
Assistant Professor, Exercise Sciences

Michelle Riley, PhD
Asst. Teaching Professor, Health Sciences

Randall Logan, PhD
Director, Biotech

Jack Treml, PhD
Asst. Director, Biotech

1:30pm – 1:55pm Session 1

Regents Center 110 **Talk #01**
The role of the Warburg Effect in Immune Evasion in Solid Tumors:
Assessing the effects of lactate on the immune responsiveness of T cells in vitro
Kaitlyn Sy

Regnier 153 (Virtual) **Talk # 02**
Strength and Mobility Training for a Long and Fruitful Life
Marcos Hernandez

2:00pm – 2:25pm Session 2

Regnier 150 **Talk #03**
Harnessing Nature's Palette:
Bioengineering yeast for the sustainable betalain pigment production
Bridget Ruhme

Regnier 153 (Virtual) **Talk #04**
Sleep Dysregulation: What is it, and why should we care?
Samuel Lane

Regents Center Lobby, Poster Session
Acute Changes in Segmental Composition Estimates Following Exercise with Blood Flow Restriction in Females **Poster #01**
KathleenMae Rogers

Exploring CYP1A2 Enzyme Activity and Caffeine Metabolism: **Poster #02**
Insights from family and external samples
Kuljeet Kaur

2:30pm – 2:55pm Session 3

Regnier 150 **Talk #05**
Modulation of Col1A1 Expression in Human Dermal Fibroblasts
Olive Njoroge

Regnier 151 **Talk #06**
Riparian Buffer Benefits
Paige Denning

Regnier 153 (Virtual) **Talk # 07**
What are the Psychological Impacts of Long COVID on the Mental Health & Quality of Health of Americans
Matthew Holtman

3:00pm – 3:25pm Session 4

Regnier 151 **Talk #08**
Instructor Comprehension of Autism Spectrum Disorder (ASD): A qualitative study on college faculty knowledge and preparedness
Martha Antoszewski & Ashley Ramos

Regnier 153 (Virtual) **Talk #09**
Encouraging Leisure Physical Activity to Offset the Risks of Occupational Physical Activity
Isamara Cortes Cruz

3:00pm – 3:25pm Session 4

Regnier 150 **Talk #10**

Blue River and Bush Honeysuckle Literature Review

Samuel Kennedy

Abstracts

Kaitlyn Sy, Biotechnology **Talk #01**

The role of the Warburg effect in Immune Evasion in Solid Tumors:
Assessing the effects of lactate on the immune responsiveness of T cells in vitro

Abstract

T cells play a key role in protecting the body from cancer. While T cells are normally effective in destroying abnormal cells, there are times when malignancies grow seemingly unchecked by the immune system. Chimeric antigen receptor (CAR)-T cell therapy implements T cells that have been genetically engineered to recognize and kill cancer cells. While CAR-T cell therapy has demonstrated efficacy in treating hematological malignancies, it has shown less promise in treating solid tumors. A possible explanation for the decreased efficacy of T cells and T cell-based immunotherapies in destroying solid tumors may lie in a phenomenon that scientists have long been aware of. The Warburg effect, first described in 1924, is the observation that cancer cells tend to consume significantly more glucose than other cells due to their shift from aerobic respiration to fermentation, resulting in the accumulation of the waste product lactate in the tumor microenvironment. This research investigated the effects of lactate on the immune responsiveness of T cells, using Jurkat E6.1 cells as a model. Cell viability and CD3 surface expression following treatment with lactate were assessed via flow cytometry. The effect of lactate on T cell signaling was determined via Western blot. While concentration and exposure time had no significant effect on T cell viability, marked decreases in CD3 surface expression and signaling were observed following exposure to lactate. These findings may shed light on how solid tumors evade immune detection and immunotherapies and have implications for future approaches to treating solid tumors.

Bio

Kaitlyn Sy is a senior in the Biotechnology program at the University of Kansas Edwards Campus. After completing her undergraduate degree, she will pursue her M.D. at the University of Kansas School of Medicine. She is devoted to improving outcomes for cancer patients through research, clinical practice, and community service.

Marco Hernandez, Health Sciences **Talk #02**

Strength and Mobility Training for a Long and Fruitful Life

Abstract

Strength and mobility have long been linked to help keep your body in good working condition. As we age our bodies undergo degenerative changes. From the ages of 30-70 we lose mobility up to 20 to 30%. Through the same age range we lose over 40% of our strength, most noticeably in our lower extremities. Maintaining a strength program has been shown to help combat some of the degenerative changes. The Sports Medicine Journal states that a strength program done 2-3 days a week has shown a substantial improvement in maintaining strength. Mobility training also aids in maintaining strength. Mobility training has also been shown to aid improvement in balance. Proprioceptive training helps to improve motor skills and balance. Having a proprioceptive mobility program shows increase in flexibility and strength in an older population. As we age, our balance and equilibrium suffer. This all helps us to achieve a better quality of life. Participating in a strength and mobility program 2 to 3 times a week can lower your mortality risk by 27%. Being able to move better and have good strength allows us to enjoy all aspects of our lives.

Bio

Marcos Hernandez has a background in Physical Therapy and fitness training and founded/owns the District Strength, Mobility and Recovery training center. He is currently working toward a degree in Health sciences with the emphasis on Strength and Conditioning.

Bridget Ruhme, Biotechnology

Talk #03

Harnessing Nature's Palette:

Bioengineering yeast for the Sustainable betalain pigment production

Abstract

The fast-paced digital era has sparked an alarming surge of micro-trends in the fashion industry. Many companies prioritize mass production of textiles to fuel this culture of disposable fashion. This mass production of dyed textiles relies heavily on the use of synthetic azo dyes and, in some processes, the use of heavy metals such as lead, mercury, and chromium VI. Consequently, our planet's landfills are inundated with an overwhelming volume of clothes that can leach toxic or carcinogenic chemicals into the environment. In response, scientists are researching sustainable alternatives that can harness living organisms to produce biosynthetic dyes that have less environmental impact. To contribute to this research effort, I aimed to develop a bioengineered strain of yeast that expresses red pigments called Betalains, a gene derived from beetroots. To achieve this, I cloned a three-enzyme polyprotein (RUBY) comprised of the requisite enzymes to express Betalains from a construct made for plant-based production into a plasmid for yeast expression. The expressed biosynthetic dye was then purified and its fabric-standing properties were characterized. Ultimately, this bioengineered yeast strain can be used to mass produce the red biosynthetic dye, Betalain, which could replace environmentally harmful synthetic dyes. This research project serves as a proof-of-concept study that could lay the foundation for broader adoption of more sustainable and ethically conscious textile dyeing processes for decades to come.

Bio

Bridget Ruhme will graduate with a Bachelor of Applied Science in Biotechnology from The University of Kansas. Bridget plans to work in the biotech industry. During that time, she will seek research residencies within the new sustainable design practices from bio-mediums to expand her capstone idea.

Samuel Lane, Bachelor of Health Sciences

Talk #04

Sleep Dysregulation:

What is it, and why should we care?

Abstract

Sleep is a common element of human life, and one that is crucial to comprehend due to its inevitability. One-third of twenty-four hours must be dedicated to rejuvenation of the mind and body, the gateway to proper performance in all aspects of life. The problem is, one in three Americans are sleep deprived, and many more develop insomnia or related sleep disorders each year. Even one less hour of sleep than the recommended amount per evening may lead to compromised health, including diabetes and heart disease, damaging us from the inside out. This presentation aims to solidify the meaning of proper sleep and its implications for the adult population. The nuances of sleep dysregulation and its repercussions to wholesale human health will be explored, finishing with research-backed advice for every listener to implement for optimized sleep performance.

Bio

Samuel Lane is a Senior Health Sciences student residing in Boca Raton, Florida, and is anticipating graduation this May 2024. He is a NASM Certified Personal Trainer who enjoys all things health and fitness, particularly passionate about sleep optimization and related healthy habits.

Olive Njoroge, Biotechnology **Talk #05**

Modulation of Col1A1 Expression in Human Dermal Fibroblasts

Abstract

Wound healing is an essential process that the body undergoes to protect us from infections and keep our skin intact. Similar to many other normal functions in the body, wound healing can go awry in rebuilding our skin's barrier– namely, the potential for keloid scar development. Keloids are a type of raised scar tissue that forms at the site of injury to the skin. A keloid scar's size, shape, and potential to cause pain or restrictive movement varies across individuals and populations; however, keloid scar formation incidence rates are known to have a genetic predisposition. Keloid scar formation is largely thought to occur when skin cells (fibroblasts) over express collagen type 1 during the wound healing process. That said, regulation of collagen type 1 expression in fibroblasts could serve as a viable therapeutic target for mitigating keloid scar formation. This research project aimed to exploit biotechnological techniques capable of modulating expression of collagen type 1 through manipulation of the COL1A1 gene and its transcripts in human fibroblasts. Additionally, the project aimed to design assays that can quantify the abundance of collagen type 1 in the extracellular and intracellular environments of cells grown in culture. Ultimately, this project may enable future studies to explore COL1A1 gene manipulation as a therapeutic target to treat or prevent keloid scar formation in humans.

Bio

Olive Njoroge is an undergraduate student studying Biotechnology at the University of Kansas Edwards Campus and a Scholar in the Intelligence Community Centers for Academic Excellence (ICCAE). With an interest in the investigative nature of science, she hopes to continue to learn and evolve when she enters the industry while weighing out her options for furthering her education.

Paige Denning, Environmental Studies **Talk #06**

Riparian Buffer Benefits

Abstract

Riparian buffers or riparian corridors are areas of vegetation in land areas surrounding a stream. Vegetation near streams can be extremely useful in minimizing bank erosion, improving water quality, protecting the stream from urban runoff, and preventing flooding. There are multiple reports and experiments regarding riparian buffer benefits. However, the question remains: Exactly how beneficial are riparian buffers in improving water quality, reducing negative impacts of urban runoff on streams, and preventing flooding; and, how do we quantify these benefits (i.e. highest efficiency based on buffer distance from the stream, size of stream setback, percentage of impervious cover in the area)? This presentation will summarize research on how riparian buffers work and recommendations to optimize these benefits in public policy and stormwater management guidance.

Bio

Paige Denning is a student at the University of Kansas, Lawrence campus. Paige is graduating in May 2024 with a degree in Bachelor of Science, majoring in Environmental Studies and minoring in Psychology. This talk will present Paige's Environmental Studies capstone project course with Scott Schulte.

Matthew Holtman, Health Sciences **Talk #07**

What are the Psychological Impacts of Long COVID on the Mental Health & Quality of Life of Americans?

Abstract

COVID-19 is a disease most of us the world over are familiar with, however there is a lack of understanding regarding Long COVID and the impact it has on the afflicted.SARS-CoV-2 is the virus, COVID-19 the disease that results from an infection of the virus & Long COVID presents as the chronic phase of COVID-19.

Long COVID is the result of one not being able to fully recover from the acute phase of COVID-19. The lingering symptoms and severity of Long COVID can vary across individuals. These symptoms may include fatigue, brain fog, breathing issues, exhaustion, anxiety and/or depression. With this, mental health issues are consistently reported alongside a diminishing quality of life.

The prevalence of Long COVID is on the rise per the Household Pulse Survey by the Census Bureau & National Center for Health Statistics. This survey showed the estimate for those experiencing Long COVID in January to February of 2023 to be ~15% & in January to February 2024 to be 17.6%. A Pew survey found that only 1 in 5 Americans see COVID-19 as a threat to public health & 1 in 10 are “very concerned” with acquiring it.

Bio

Matthew Holtman is dedicated to health and fitness with 20 years of experience in the industry. He has two associate degrees, is a licensed PT Assistant, and in his free time, enjoys spending quality time with his son and dogs, and engages in art, research, and gardening projects.

Martha (Mattie) Antoszewski, Psychology
and Ashley Ramos, Psychology

Talk #08
Poster #03

Instructor Comprehension of Autism Spectrum Disorder (ASD):
A qualitative study on college faculty knowledge and preparedness

Abstract

Autism spectrum disorder (ASD) is a neurodevelopmental disorder that causes impaired social interactions, difficulty in sensory processing, and restrictive and repetitive patterns of behavior. An estimated 1 in 59 children are diagnosed with autism spectrum disorder each year. This is a significant increase from two decades ago, where the ratio was 1 in 5000. While there is a multitude of research regarding services and accommodations for students with ASD in K-12, there is very little for college students with ASD. Due to this gap in research, these researchers decided to examine college instructor preparedness in having students with autism spectrum disorder in the classroom. A group of college instructors at a midwestern university will be recruited via email to participate in a quantitative study using three questionnaires to examine knowledge of autism spectrum disorder and comfortability with accommodating students' needs with this disorder in the classroom. As this study is still ongoing, results have yet to be obtained. We expect to see results showing low knowledge of ASD in college instructors and a positive correlation between scoring higher on the scale and knowing someone with autism spectrum disorder or having prior experience working with or researching autism spectrum disorder.

Bio

Mattie is a Senior at the University of Kansas majoring in psychology and minoring in sociology. Along with being a senior at KU, she is a registered behavior technician and works in the field of applied behavior analysis.

Isamara Cortes Cruz, Health Sciences **Talk #09**

Encouraging Leisure Physical Activity to Offset the Risks of Occupational Physical Activity

Abstract

To achieve and maintain good health, it is recommended to eat nutritiously and incorporate daily exercise. A balanced diet is a great start, however it is not always clear what adequate exercise looks like. Physical activity is one of many ways to prevent or reduce the risk of developing diseases, and it is recommended to do 150 minutes of it every week. But the Centers for Disease Control and Prevention report that only about one quarter of adults 18 years and older fulfill this requirement. Physical active labor done at work may be classified differently than leisure time activity. Occupational physical activity (OPA) consists of repetitive physical movements associated with a job where conditions may not be in control of a person. Conversely, leisure physical activity (LPA) is voluntary physical activity outside of work time, it's usually a preferred and enjoyable activity. Despite the fact that people move their bodies during OPA, it does not provide the same benefits as LPA. This presentation will analyze the effects of OPA found in previous studies, it will show the results from a collection of data from a vulnerable population, and it will discuss current and future health initiatives to encourage LPA in order to address this health concern.

Bio

As a first generation Latina, Isamara Cortes Cruz is a dedicated student pursuing her degree in Health Science. Her passion lies in health education and prevention, with a focus on serving Hispanic and underserved populations.

Samuel Kennedy, Environmental Studies **Talk #10**

Blue River and Bush Honeysuckle Literature Review

Abstract

Lonicera maackii is an invasive plant that reduces the populations of native flora in ecosystems it invades by outcompeting them for light and nutrients. Places known to be infested by it include the Blue River in the Kansas City metropolitan area. Studies have repeatedly shown that honeysuckle density is high throughout the Blue River's watershed, with some locations having been turned into near monocultures. Because of this, recent restoration efforts concerning the Blue River have focused on removing this invasive plant. However, it has been theorized that Lonicera maackii provides benefits to invaded ecosystems such as being effective at carbon sequestration, which has raised questions as to whether completely removing it is appropriate. To answer this question, a literature review was conducted on information regarding the Blue River and Lonicera maackii so that a better-informed decision could be made. Among the topics researched were the negative effects of the plant on ecosystems, the potential for benefits it could bring, and what benefits a restored Blue River could offer. It was ultimately concluded that the costs of its presence severely outweigh the benefits and thus its removal should be continued.

Bio

Samuel Kennedy is an undergraduate student at the University of Kansas and attends the Edwards Campus. Samuel anticipates graduating in the fall semester of 2024 with a Bachelor of Science in Environmental Studies. This presentation is part of Samuel's capstone project with Scott Schulte.

KathleenMae Rogers, Exercise Sciences **Poster #01**

Acute Changes in Segmental Composition Estimates Following Exercise with Blood Flow Restriction in Females

Abstract

Resistance exercise with blood flow restriction (BFR) is becoming a frequently used training implement that elicits adaptations such as hypertrophy in males yet acute changes in muscle have yet to be elucidated in females specifically. PURPOSE: The purpose of this study was to determine any acute muscle composition changes to single-leg exercise in trained females. METHODS: Fourteen healthy and active females (age: 24.9±5.8 years; BMI: 25.4±4.7 kg/m2) were assessed for baseline segmental and total body water and lean mass with multifrequency bioelectrical impedance analysis (BIA) and 1-3 repetition maximum (RM) single-leg, leg press with their dominant (Dom) and non-dominant (NonD) limbs. Participants completed BIA before (Pre) and after (Post) an exercise session using only their Dom limb with either traditional (TRAD: 4 sets of 8 repetitions at 75% 1-RM) or low-load plus BFR (BFR: 1 set of 30 reps and 3 sets of 15 reps at 25% 1-RM) on randomized days, 48 hours apart. RESULTS: Leg lean mass and water estimates increased from Pre to Post BFR (+0.11 kg; $p<0.001$) in Dom with no change or decreases in estimated leg lean mass ($p=0.182$) and limb water ($p=0.102$) following TRAD exercise. NonD presented greater limb water content and mirrored limb lean mass following TRAD (+0.129 L; $p=0.007$) despite both conditions contributing to greater Dom limb water after BFR (+0.36 L; $p<0.001$) and TRAD (+0.18 L; $p=0.015$). CONCLUSIONS: Fluid shifts and water redistribution that occur following low-load exercise with BFR are more pronounced than TRAD in the exercising leg.

Bio

KathleenMae Rogers graduated from the University of Kansas with a Bachelor of Science in Exercise Science. She is continuing her education at KUMC in the DPT/PhD program.

Kuljeet Kaur, Applied Biological Sciences **Poster #02**

Exploring CYP1A2 Enzyme Activity and Caffeine Metabolism:

Insights from family and external samples

Abstract

In this study, the alleles of various samples were investigated, focusing specifically on a single-nucleotide polymorphism (SNP) within the CYP1A2 gene, crucial for caffeine metabolism. The aim was to explore the identification and inheritance of alleles influencing caffeine metabolism within a family tree and among additional individuals. DNA isolation techniques, PCR, and restriction enzyme digest were performed on 5 family samples and 2 external samples, using ApaI and SacI as the restriction enzymes. The ApaI and SacI enzymes played a key role in identifying diverse caffeine metabolism patterns, crucial for determining the identity and inheritance of caffeine metabolism genotypes. Subsequently, the gel electrophoresis analysis provided valuable insights into establishing the identity and inheritance of these genotypes. To further analyze the results and enhance our understanding of caffeine metabolism traits, statistical predictions were made for untested family members and gene inheritance probabilities within the family tree. This project not only provided an understanding of how genetic testing is conducted but also offered valuable and personal insights, especially through its application within my family context.

Bio

Kuljeet Kaur is a student at the University of Kansas, majoring in Applied Biological Sciences and minoring in Religious Studies. She participates in supporting healthcare at Menorah Medical Center and volunteers at KC Care, where she provides essential resources and preventive measures for Kansas' homeless population.

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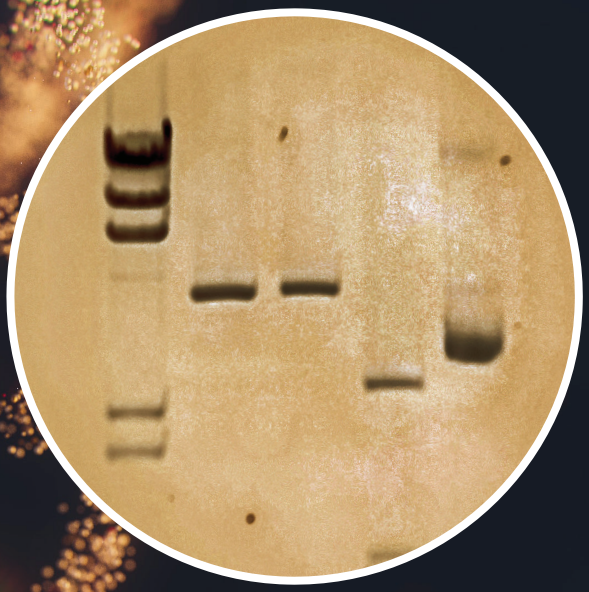

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