

SIXTH ANNUAL LMU RESEARCH DAY

APRIL 22, 2022



LMU

Lincoln Memorial University

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LMU RESEARCH DAY COMMITTEE MEMBERS

Denise Terese-Koch, BS, DDS, FAGD, MBA, EdD – Committee Chair

Dean and Chief Academic Officer, College of Dental Medicine

Michael Neff, MA, MS

Professor of Mathematics

Edmond Lyonga, PhD

Program Director, Doctor of Business Administration

Associate Professor of Business

Chris Stotts, EdD

Assistant Professor of Education

Amanda Rainey, DVM

Assistant Professor of Veterinary Medicine

Logan McCarthy, DNP, APRN-BC, APMHNP, FPMHNP, RN

Assistant Director, Family Psychiatric Nurse Practitioner Concentration

Assistant Professor of Nursing

Beth Kitts-Morgan, PhD

Associate Professor of Physiology

Stephanie Holyfield, PhD

Visiting Assistant Professor of History

Natalie Freeman, PhD

Director of Research, Knoxville

Assistant Professor, Biochemistry

Adam Gromley, PhD

Director of Research, Harrogate

Associate Professor, Molecular and Cellular Biology

Marisa Anders, MEd

Director of Public Relations

Melissa Miracle, BA

Post Award Grants Manager

Carolyn Gulley, MEd

Executive Director, Office of Research, Grants and Sponsored Programs

Lanie Brunk, BS

Administrative Assistant, School of Mathematics & Sciences

Ex Officio Member:

Adam Rollins, PhD

Dean, School of Mathematics and Sciences

Professor of Biology

AGENDA

8 a.m. – 8:30 a.m.

Registration

First Floor Atrium CVM

(Poster Presentations set up at 10:30 a.m.)

8:30 a.m. – 10:30 a.m.

Oral Presentations

CVM 332 and CVM 335

(Abstracts listed on page 10)

10:45 a.m. – 12:00 p.m.

Poster Presentations

CVM Atriums 1st, 2nd and 3rd Floors

(Abstracts listed on page 16)

12 Noon – 1:30 p.m.

Break for Lunch and

Keynote Address

CVM 100 and CVM 101

1:30 p.m. – 2:45 p.m.

Oral Presentations

CVM 332 and CVM 335

(Abstracts listed on page 13)

3:00 p.m. – 4:15 p.m.

Poster Presentations

CVM Atriums 1st, 2nd and 3rd Floors

(Abstracts listed on page 23)

4:30 p.m. – 5:00 p.m.

Awards

CVM 100 and CVM 101

TIMELINE

Morning Oral Presentations

CVM 332 and CVM 335

CVM 332:

8:30 a.m. – 8:45 a.m.

Lindsey Cochran

Middle Grades General Educators' Perceptions of Preparedness to Provide Instruction to Students with Disabilities

8:45 a.m. – 9:00 a.m.

Emily Halsmer

Clinical ophthalmic parameters of the Quaker parrot *Myiopsitta monachus*

9:00 a.m. – 9:15 a.m.

Jesselyn Posada

The Impact of Co-sleeping With a Dog on Sleep Quality and Duration

9:30 a.m. – 9:45 a.m.

Sidney Dupree & Taylor Craft

Reproductive Effects of Levonorgestrel in *C. elegans*

9:45 a.m. – 10:00 a.m.

Kelsie Tuggle

Analysis of Heavy Metal Concentration in Knox County, TN Water Samples

10:00 a.m. – 10:15 a.m.

Emily Roark

Activity of ticks from various habitats and times of day, and corresponding infection status with *Borrelia* spp. and *Babesia* spp.

CVM 335:

8:30 a.m. – 8:45 a.m.

Isabelle Sico

Assessing Medical and Pharmacy Students' Perceptions of Teamwork and Communication on Patient Safety Practices

8:45 a.m. – 9:00 a.m.

Troy Kendrick

Perceived Intelligence and Mindset in The Performance of The Osteopathic Medical Student

9:00 a.m. – 9:15 a.m.

Andrew Rudd

Sportsmanship Attitudes as a Moderator of the Relationship Between Team Identification and Spectator Aggression

9:30 a.m. – 9:45 a.m.

Abigail Heiniger

The All-Woman Sister-Lover: Sovranty Hag's Afterlife as Hairy Rucky

9:45 a.m. – 10:00 a.m.

Kelsey Metz & April Anderson

The Relationship of Small Business Social Media Use to Innovative Work Behavior and Organizational Performance

10:00 a.m. – 10:15 a.m.

Katharine Messer

Certified Educators' Perceptions of Response to Intervention and Instruction in East Tennessee Public High Schools

10:15 a.m. – 10:30 a.m.

Jennifer Savage, Jennifer Russomanno, Sherry Jimenez, Jeremy Buchanan

Developing Awareness of Financial Insecurities as a Social Determinant of Health: An Interprofessional Service-Learning Food Stamps Activity

Morning Poster Presentations

CVM Atriums 1st, 2nd and 3rd Floors

10:30 a.m. – 12 Noon

1. Audrey Burnette

The Retention of Equine Veterinarians Longitudinal (REVL) study

2. **Zurriat Syed**
Visual Health Impact of Online Learning During COVID-19 in Osteopathic Medical Students
3. **Nicholas Toma**
Blastodinium Parasitism of Estuarine Calanoid Copepods: Potential Population/Environmental Impacts
4. **Tristan Lackey**
Systematic Review on Work Satisfaction and Burnout in Human and Veterinary Medicine
5. **Kristina Venditto**
Burnout Among Equine Veterinarians
6. **Shohreh Kahhal**
Co-exposure to nanomolar doses of the pharmaceutical drugs bardoxolone-methyl and bortezomib abrogates prostate cancer cell growth in vitro
7. **Talal Khan**
Effect of bardoxolone-methyl (CDDO-Me) and dimethyl sulfoxide (DMSO) combination on prostate cancer cell growth and migration in vitro
8. **Kaliegh Cross-Brown**
Protocol and Internal Website Development for the Extraction and Evaluation of Herbal Substances
9. **Ashley Sundin & Haley Felts**
An Exploration of Bacterial Microbiomes in Eastern Tennessee Ambulances
10. **Sidney Harrison & Megan Rochford**
Role of a Flavonoid In Mouse Melanoma Cells
11. **Andrew Kleehammer**
A Novel Finding of Isolated Parachute Mitral Valve and Left Ventricular Non-Compaction Presenting as New Onset Cardiomyopathy in an Adult Patient
12. **Hannah Roland & John Holland**
Role of Chrysin in Human Pancreatic Cells
13. **Jonathan Guihurt & Allison Martin**
Quantified Exposure to Clinical Procedures by Rotation Setting in the OMS Third and Fourth Years
14. **Amar Bukvic**
Melittin and its synthetic analogs show decreased hemolytic activity in serum: a crucial observation to facilitate their translation as novel antibacterial agents
15. **Paula Miksa & Stephanie Condor**
Healthcare Literacy and Interprofessional Telehealth Considerations
16. **Misti Lopez**
Life Expectancy in Dogs with Stranger-Directed Fear Compared to Dogs with Separation Anxiety
17. **Briana Meredith**
The Effects of Hydrotherapy Verses Therapeutic Therapy for Canines with Degenerative Myelopathy
18. **Cana Short**
Baylisascaris in Raccoons found in Urban and Rural Areas
19. **Macee Zaffiro**
Dogs with separation anxiety
20. **Autumn Sharp**
Prevalence of Mycoplasma Wenyonii in Cattle in Central Appalachia
21. **Kailey Spann**
Grain Free Diets vs Dilated Cardiomyopathy
22. **Kristina Emmette**
Quality of Life Measured After Lymphoma Chemotherapy in Felines Treated With Prednisolone as Pre-treatment
23. **Kiley Holmes**
The Human Animal Bond's Affect on Nightmares Caused by PTSD
24. **McKaelyn Hatmaker**
Stem Cell Therapy in Canines with Chronic Spinal Cord Injuries
25. **Lindsay Horton & Gage Keck**
Prevalence of and Attitudes of Vaping Among Students at LMU

26. **Caitlyn Lindell**
Synthesis of a Vitamin B-12 Conjugate with a Mitochondrial Localization Peptide
27. **Jasmyne Thomas**
The Potential Antimicrobial Activity of Acetylferrocene
28. **McKinley Burns**
Improvement of Depression with Dog Adoption

- 2:00 p.m. – 2:15 p.m.
Sandra Frempong
Accounting and Tax Reporting for Virtual Currency (Cryptocurrency)
- 2:30 p.m. – 2:45 p.m.
Emma Cummings, Chrissy Bradley, Emily Roark, Lara Gunter, Sarah Long, Sarah Fultz, Kaitlyn Luster, Mackenzie Amoureux
Lincoln's Long-Lost Legacy: Lesser-Known Stories of Abraham Lincoln

Afternoon Oral Presentations

CVM 332:

- 1:30 p.m. – 1:45 p.m.
Nathan Turrell
Piroplasms in the genera Babesia, Theileria, and Cytauxzoon from Ixodid Ticks in the Cumberland Gap Region
- 1:45 p.m. – 2:00 p.m.
Mary Kabir
Bartonella prevalence, diversity and associated risks in Appalachia
- 2:00 p.m. – 2:15 p.m.
Warren Dean
Analysis of implementing non-medical professional Glaucoma screening in a free medical clinic setting.
- 2:30 p.m. – 2:45 p.m.
Petra Brnova
Strategic Organizational Sustainability Climate: Scale Development and Validation

CVM 335:

- 1:30 p.m. – 1:45 p.m.
Sarah Hopkins
The Effects of ECIG-generated Aerosol on the Longevity, Growth, and Lipid Metabolism of *C. elegans*
- 1:45 p.m. – 2:00 p.m.
Hannah Blevins
Occupancy of Allegheny woodrat and small mammals at rocky outcrops of Lilley Cornett Woods

Afternoon Poster Presentations

CVM Atriums 1st, 2nd and 3rd Floors

3:30 p.m. – 5:00 p.m.

- Jun Wang & Marissa Viola**
Concurrent p53 mutation in EGFR mutant non-small cell lung cancer is associated with resistance to first and second generation EGFR tyrosine kinase inhibitors, a meta-analysis
- Jeremy Turner**
The impact of psychological needs on the organizational commitment of employees who work from home.
- Kayla Medlin**
Outcomes of cats and dogs adopted during the COVID-19 pandemic
- Hannah Sherrod & Jetta Brady**
Developing a Program of Research to Assess the Anxiolytic Properties of Appalachian Herbs in Danio rerio
- Bhavik Patel & Gursimran Udwani**
Melanoma in Dermatological Care in Appalachia
- Katherine Kirkendall & Madison Criswell**
Infectious Diseases of Cats in Kentucky, Tennessee, and Virginia
- Kaitlin Sons & Jonathan Guihurt**
Bilateral Anotia and Common Co-morbidities: A Case Study of a Human Donor

8. **Lydia Murray & Jaresiah Williams**
Impact of human-animal bond on mental health and pet preventative care
9. **Meaghan Kuzmich & Cambri Fox**
Qualitative Survey of Dance for Parkinson's Participants in Rural Appalachia
10. **Stacie Williams**
Dog Owner Use and Perceptions of Canine Heartworm Prophylaxis for Prevention of Canine Heartworm Disease
11. **Blaine Marie & Sarah Daabies, Christine Sniffen**
Dexterity in Healthcare Students: Lessons Learned and Changes Implemented
12. **Nicholas Townsend & Jeffrey Martin**
The influence of different target inflation pressures on physiological outcomes associated with external counterpulsation (ECP)
13. **Hannah Blevins**
Prevalence and diversity of Ehrlichia spp. from Ixodid ticks in the Cumberland Gap Region of Tennessee, Kentucky, and Virginia
14. **Sinclair Conley**
Evaluating Weight Status of Dog Owners as a Possible Weight Predictor for Their Dogs
15. **Amanda Lyles**
Effectiveness of Dry Needle Acupuncture of Arthritic Canines
16. **Robin Reed**
Chemical Analysis of Cr in Tartary Buckwheat Tea (*Fagopyrum tataricum*)
17. **Stephanie Wright**
Assessment of the Virulence of *Escherichia coli* Samples Collected from the Powell River
18. **Morgan Simpson**
A Tricky Decontamination Situation: Characterizing the *Trichomonas gallinae* Growth Curve After Disinfectant Exposure
19. **Adamarys Gonzalez Frutos**
How Does Western Medicine Compare to Chinese Acupuncture When Treating Hip Dysplasia in Dogs?



KEYNOTE SPEAKER
DR. MURRAY MARKS

Director of Forensic Education, College of Dental Medicine

Oral Presentations

Lindsey Cochran

Carter and Moyers School of Education

Faculty Advisor: Cherie Gaines

Middle Grades General Educators' Perceptions of Preparedness to Provide Instruction to Students with Disabilities

Abstract: Beginning in the 1970s, educational legislation and mandates changed the way students with disabilities received an education in the United States and increased the number of students with disabilities in general education classrooms. The increased numbers of students with disabilities in general education classrooms created the need for general educators to be knowledgeable about students with disabilities and special education. Due to minimal extant literature related to general educators' training and preparation, specifically regarding the education of students with disabilities at the middle school level, the purpose of this qualitative, interpretive study was to examine the perceptions of middle grades general educators in Tennessee related to training and preparedness to provide instruction and support to students with disabilities in general education classrooms. After collecting data via online questionnaires from 14 participants, I analyzed the data using open, axial, and selective coding to generate themes. Middle grades general educators in Tennessee indicated required college coursework and professional development opportunities failed to prepare them to provide instruction and support to students with disabilities in their classrooms. These general educators also reported attending limited or no professional development opportunities after initial teacher training related to special education and students with disabilities.

Isabelle Sico

DeBusk College of Osteopathic Medicine

Faculty Advisor: Dr. Sherry Jimenez

Assessing Medical and Pharmacy Students' Perceptions of Teamwork and Communication on Patient Safety Practices

Abstract: Patient safety education plays a significant role in the identification and prevention of clinical errors in a medical and patient-care setting, though its longitudinal role spanning pre-clinical and clinical training has not been sufficiently studied for medical and pharmacy students. TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) is the national standard for team training in healthcare and targets the importance of interprofessional teamwork and communication to ensure safe healthcare delivery. This study aims to understand students' perceptions of teamwork and communication in early clinical training and assess how students perceive and identify patient safety errors, concerns, and teamwork

effectiveness in clinical environments when formally trained in patient safety curriculum.

Study participants consist of third-year medical students from LMU-DCOM and pharmacy students from the University of Tennessee Health Science Center and South College School of Pharmacy who completed the TeamSTEPPS® Essentials training program in their pre-clinical education during the 2020-2021 academic year. Students will be assessed on their perceptions towards teamwork and communication with regards to patient safety practices in their clinical learning environments using a three-part quantitative and qualitative survey. This survey will be administered three times over a span of the cohort's three years in clinical training, graduate medical education, and/or clinical practice. Data will be analyzed independently and triangulated with post curriculum comprehension and satisfaction surveys regarding TeamSTEPPS® training.

The goal of this research is to assess medical and pharmacy students' perceptions towards teamwork and communication with regards to patient safety practices in their clinical education following a patient safety focused curriculum.

Emily Halsmer

College of Veterinary Medicine

Faculty Advisors: Erin Scott & Jennifer Heatley (From the VMSRTP TAMU-CVM veterinary ophthalmology department 2021)

*Clinical ophthalmic parameters of the Quaker parrot *Myiopsitta monachus**

Abstract: This study established normal ophthalmic ranges for select diagnostic tests in clinically normal Quaker parrots *Myiopsitta monachus*. Ninety-six captive, adult Quaker parrots had values for weight, body condition score, neuro-ophthalmic reflexes, phenol red thread test, rebound tonometry, fluorescein staining, palpebral fissure length, slit lamp biomicroscopy, indirect fundoscopy, and ocular ultrasound biometry recorded. All Quaker parrots had positive menace responses, dazzle reflexes, and direct pupillary light reflexes. Mean \pm SD tear production was 13.3 ± 4.0 mm/15 sec. Mean \pm SD intraocular pressure (IOP) was 10.6 ± 1.4 mmHg and 6.0 ± 1.3 mmHg in the D and P calibration settings, respectively. A greater coefficient of variation in P compared to D suggested the D setting as more reliable for use in this species. Mean \pm SD ocular ultrasound measurements included axial globe length (8.1 ± 0.2 mm), anterior chamber depth (0.96 ± 0.2 mm), lens thickness (2.6 ± 0.1 mm), vitreous length (4.5 ± 0.2 mm), axial pecten length (3.3 ± 0.3 mm), and oblique pecten length (3.6 ± 0.4 mm). Anterior chamber depth increased with age. Males weighed more and had longer axial globe and vitreous depths compared to females. No other ocular measurements were affected by age, weight, or sex. Incidental adnexal and ocular lesions were identified in

52/192 eyes of 36/96 Quaker parrots but did not statistically affect created ranges. This work provides references and clinical findings to assist with monitoring and maintaining the health of free-living and captive Quaker and other small parrots.

Troy Kendrick

DeBusk College of Osteopathic Medicine
Faculty Advisor: Dr. Natalie Freeman

Perceived Intelligence and Mindset in The Performance of The Osteopathic Medical Student

Abstract:

Introduction: Mindset theory is a deeply explored concept with implicit assumptions about how our abilities and intelligence have dominating impact on how we view our failures. The ideas of fixed and growth mindset can influence a student's ability to succeed academically, as well as traverse through adversity. It is thought that a student possessing the growth mindset will be able to perform adequately even when faced with the threat of failure. While students who possess a fixed mindset are more apt to harbor self-doubt after poor academic performances.

Objectives: This study will aim to determine if growth mindset accompanied with a particular goal achievement is correlated with academic ability to thrive in lieu of the known stressful circumstances for osteopathic medical students.

Methodology: A cross sectional study of students at Lincoln Memorial Debusk College of Osteopathic Medicine was performed. Participants were asked to complete an optional anonymous survey with no incentive. Opportunity to complete the survey was given amongst first- and second-year medical students. The survey consisted of the Implicit Theories of Intelligence Scale (ITIS), Emotional Intelligence Scale, the Perceived Stress Scale (PSS), and the Patient Health Questionnaire (PHQ-4).

Results: The majority of students tended to have a growth mindset regardless of lower or higher GPA. Students with a lower GPA found to have significantly higher levels of anxiety and depression.

Summary/Conclusion: Even though most students have a growth mindset, this positive outlook on academic ability may not solely be enough to overcome the increased levels of anxiety and depression which negatively affect academic performance. Properly assessing high levels of anxiety, depression, and stress, are career defining variables which need to be addressed by more academic institutions. Development of better emotional support for students will prove to be a key factor in successful academic performance of osteopathic medical students.

Jesselyn Posada

College of Veterinary Medicine
Faculty Advisor: Lauren Wisnieski

The Impact of Co-sleeping With a Dog on Sleep Quality and Duration

Abstract: There is some evidence that co-sleeping with pets can negatively impact owners' sleep quality. However, there are very few studies that investigate the impact of co-sleeping with a companion animal on sleep quality. We aim to fill this gap by conducting an online survey among dog-owning college students. We designed a 5-10 minute survey that includes questions on sleep quality and duration, pet co-sleeping habits, mental health, COVID-19 stressors, alcohol and caffeine use, and demographics. The survey will be distributed online via Qualtrics to college students 18 and older that own a dog. The outcomes of interest will be average hours per sleep per night and a composite score derived from multiple questions related to sleep quality. Responses will be analyzed using multiple linear regression models. If our hypothesis that co-sleeping with dogs reduces sleep quality and duration is supported, results may be used to inform recommendations for college students that report poor sleep quality.

Andrew Rudd

School of Business

Sportsmanship Attitudes as a Moderator of the Relationship Between Team Identification and Spectator Aggression

Abstract: Team identification is commonly defined as the extent to which an individual feels psychologically connected to a sports team. Studies have shown that higher levels of team identification are associated with a greater tendency to behave aggressively at sport events. However, it has also been suggested that sport spectators may act aggressively not only because of heightened levels of team identification but because many sport spectators lack an understanding and valuing of sportsmanship (e.g., fair play and respect for one's opponent). Therefore, the purpose of this study was to examine positive sportsmanship attitudes as a moderating variable in the relationship between team identification and spectator aggression. A sample of 217 college sports fans were recruited to participate in the study. Statistical analyses are forthcoming. A discussion of the results will be shared.

Sidney Dupree & Taylor Craft

School of Mathematics and Sciences
Faculty Advisor: Julie Hall

Reproductive Effects of Levonorgestrel in C. elegans

Abstract: Levonorgestrel (LNG) is a synthetic progestin that mimics the effects of the hormone progesterone. LNG is in the most commonly used Emergency Contraceptive Pill, Plan B, and is used in long term Intrauterine devices.

Considering 11% of women have used an ECP and 10% are using IUDs it is important to know the ramifications. LNG has been found to cause decreased oocyte formation in amphibians and certain species of fish. The purpose of this study is to test LNG's potential impact on the reproductive system and germ line in the nematode, *Caenorhabditis elegans* (*C. elegans*). Growth curves will be conducted to determine the concentrations of LNG that affect meiosis, oocyte formation and growth at 10% and 50% reductions. Fourth larval stage (L4) nematodes will be exposed to LNG for 24 hours. DAPI staining will be performed to visualize the germ line and observe the cells as they go through meiosis. Acridine orange staining will also be performed to determine if LNG causes cells to undergo apoptosis. This will help determine if there is an increase in apoptosis in the germline after exposure. The results of the study will give evidence to the effect of LNG on germ line formation.

Abigail Heiniger

School of Arts, Humanities and Social Sciences

The All-Woman Sister-Lover: Sovranty Hag's Afterlife as Hairy Rucky

Abstract: The ATU 510-A Cinderella tale is a recipe for disaster in colonial Ireland in all its variations. In nineteenth- and early-twentieth-century Irish periodicals, stories, and novels, the doubly-colonized heroine can never get to the ball with Prince Homerule because her fairy godmother got lost on her journey back from England, where she resides, enabling imperial dreams. Cinderella's fairy-tale promise is not just disappointing, it is dangerous to the Irish female protagonist who believes that the fairy-tale formula will either fulfill happiness or 'unlock social and public possibilities' (Warner xx; Bacchilega 5). Cinderella's focus on her own solitary quest to rise out of poverty by aligning herself with the ruling elite compounds the protagonist's isolation and is ultimately destructive to the colonized community dependent upon her. This self-serving Cinderella is a stark contrast to what many Irish storytellers, including Paig Sayers, call "the Other Cinderella" story: "Hairy Rucky." Hairy Rucky is a community-building, all-woman, sister-lover who draws her power from her medieval antecedent, the Sovranty Hag. Hairy Rucky embraces all the shifting characteristics of the medieval loathly ladies in Gaelic and English traditions, with a layer of fairy-tale wonder. A stark contrast to the anti-Cinderella tales printed in Irish newspapers and pamphlets, "Hairy Rucky" decolonizes the land and rebuilds the community. Even the wicked (step)sisters find their happy endings in the new world that the bearded all-woman sister-lover creates. She is a giant-slayer, king-maker, and lover and defender of all women. In fact, the only role this wonder-woman does not seem to take is that of the ATU 510 Cinderella. However, that is the label she is consistently given by story tellers. This conference paper

explores why Sovranty Hag must be reborn as an unlikely Cinderella to rebuild community and decolonize the Irish cultural imagination.

Kelsie Tuggle

School of Mathematics and Sciences

Faculty Advisor: Stephen Everly

Analysis of Heavy Metal Concentration in Knox County, TN Water Samples

Abstract: This project analyzes water samples from locations within the First Utility District in Knox County, Tennessee to show where the focus needs to be on lowering the concentration of specific heavy metals. Atomic Absorption Spectroscopy was the primary method of analysis in determining the concentration of different heavy metals found in the different water samples. The concentrations determined from the AA were compared to the standards given by the Environmental Protection Agency (EPA). The heavy metals analyzed during this project include copper, lead, and mercury.

Regulating the heavy metal content in water is important for both the health of humans and wildlife. This study may provide benefits to future endeavors when trying to create new ways to lower the concentration of heavy metals while saving both money and resources.

Kelsey Metz and April Anderson

School of Business

The Relationship of Small Business Social Media Use to Innovative Work Behavior and Organizational Performance

Abstract: The purpose of this quantitative study was to examine the relationships between social media use, innovative work behavior, and organizational performance among small businesses in the United States. Specifically, the relationships between social media use and innovative work behavior, social media use and organizational performance, and innovative work behavior and organizational performance were evaluated. A theoretical model containing these latent variables and directional paths was developed. To test the model, survey data from United States small business employees was collected through the combined use of Amazon Mechanical Turk and QuestionPro. Data was analyzed using descriptive analysis and a partial least squares structural equation model (PLS-SEM). Statistically significant positive relationships between each of the examined paths were found. Recommendations involving the use of social media by United States small businesses for the purpose of improving employee innovative work behavior and organizational performance were made.

Emily Roark

School of Mathematics and Sciences

Faculty Advisor: Barbara Shock

Activity of ticks from various habitats and times of day, and corresponding infection status with Borrelia spp. and Babesia spp.

Abstract: Understanding tick phenology can help to prevent human infection, especially important as tick-transmitted diseases are on the rise in North America. This study examines the activity of ticks in Knox County, Tennessee from different times of day and habitat types as well as infection prevalence of *Borrelia* spp. and *Babesia* spp. Ticks were collected over a four-month period in three different habitats (short grass, tall grass, and wooded areas) at three times of day (morning, afternoon, and evening). Ticks were identified to species prior to DNA extraction: *Ixodes* spp. (n=2), *Dermacentor variabilis* (n=17), *Amblyomma americanum* (n=12). PCR is underway to screen ticks for *Borrelia* spp. and *Babesia* spp. Currently four (n=11, 36%) amplified *Babesia* spp. DNA statistics and positive amplicon sequencing are pending. These data contribute to our growing knowledge of tick natural history in Appalachia. that report poor sleep quality.

Katharine Messer

Carter and Moyers School of Education

Faculty Advisor: Cherie Gaines

Certified Educators' Perceptions of Response to Intervention and Instruction in East Tennessee Public High Schools

Abstract: Since the early 2000s, federal, state, and local lawmakers and educators have worked to combat the wait to fail mentality and support higher student grade level academic achievements. Educators were tasked with finding teaching methods that better served academically struggling students, some of whom had specified learning disabilities. Federal laws created Response to Intervention instruction in all grade levels, in which educators provided students additional instructional support. During my study, I found little existing literature focused on Response to Intervention instruction in high school grade levels. The purpose of this qualitative interpretive study was to examine certified educators' perceptions of RTI2 in East Tennessee public high schools. I sent a questionnaire to 38 certified educators in varying East Tennessee public high schools. After 13 educators completed the questionnaire, I found participants did not have the same experiences with RTI in their high schools or district. The results included varying benefits of RTI instruction at the high school level, including positive mindset, increased academic success, and increased academic supports. On the contrary, the results yielded more themes of perceived barriers to RTI instruction in high schools, including lack of guidance, lack of support, lack of resources, student refusal, curriculum conflicts, and scheduling issues.

Jennifer Savage, Dr. Jennifer Russomanno, Dr. Sherry

Jimenez and Mr. Jeremy Buchanan

Caylor School of Nursing

Developing Awareness of Financial Insecurities as a Social Determinant of Health: An Interprofessional Service-Learning Food Stamps Activity

Abstract: Background: Food insecurity is a pressing public health problem and has been recognized as a leading social determinant of health (SDoH). To better equip future healthcare providers to address issues of food insecurity, students from Lincoln Memorial University's osteopathic (DO) and family nurse practitioner (FNP) programs participated in an interactive simulation project aimed at addressing food insecurity, food access, and the limitations of Federal food assistance programs.

Methods: One DO and FNP student were partnered and given a budget equal to the average weekly 2018 Supplemental Nutrition Assistance Program (SNAP) allocation for two people. Students created a weekly meal plan and shopped using only this allowance. Students then participated in a post-activity survey and focus group led by moderators. Qualitative responses from the survey and focus groups were recorded, transcribed, and analyzed inductively for codes and themes.

Results: Overall, students found this simulation exercise to be a positive experience. Students noted challenges when shopping with a partner on a limited budget, where individual preferences and dietary restrictions must be considered. Students stated they gained valuable insight from this project regarding food access, affordability, and availability that can be directly translated into caring this group of patients.

Nathan Turrell

College of Veterinary Medicine

Faculty Advisor: Barbara Shock

Piroplasms in the genera Babesia, Theileria, and Cytauxzoon from Ixodid Ticks in the Cumberland Gap Region

Abstract: Piroplasms are tick-borne pathogens of mammals and birds in the genera *Babesia*, *Theileria*, and *Cytauxzoon*. This study investigates the diversity of piroplasms from Ixodid ticks in the Cumberland Gap region. We predict that that *Babesia* will be the most prevalent piroplasm found in our study, and that piroplasm species will be correlated with tick species. We are screening Ixodid ticks for piroplasms via a PCRs that targets the ITS-1 rRNA and the 18S rRNA gene regions of piroplasms. Each of the four main tick species from the Cumberland Gap Region will be screened, i.e., *Rhipicephalus sanguineus*, *Ixodes scapularis*, *Dermacentor variabilis*, and *Amblyomma americanum*. So far, we have screened 391 *Dermacentor variabilis* ticks, and 45 ticks

have positive amplicons (11.5%). *Dermacentor variabilis* is a vector of *Cytauxzoon felis*. Sequencing will be conducted to validate amplicons and determine species. These data contribute to the understanding of tick-transmitted diseases in rural Appalachia.

Sarah Hopkins

School of Mathematics and Sciences
Faculty Advisor: Domenico Palazzolo

The Effects of ECIG-generated Aerosol on the Longevity, Growth, and Lipid Metabolism of C. elegans

Abstract: This project investigates the effects of e-cigarette (ECIG) generated aerosol on the longevity, growth, and lipid metabolism of model organism *Caenorhabditis elegans*. By exposing the microscopic nematodes to ECIG-generated aerosol in a dose-dependent manner and gathering data, it is possible to test if the aerosol is potentially cytotoxic by elicitation of an oxidative stress response within the worms. Exposure and data collection will occur over 12 days, beginning once the nematodes reach young adulthood and ending at the completion of the worms' lifecycles. The variables measured include the girth, longevity, and number of lipid droplets present within the gut epithelia of the worms. Girth is measured to determine if the ECIG-generated aerosol exposure has inhibited the production of fat cells, while measuring longevity can be indicative of whether the ECIG-generated aerosol causes pre-mature death within the experimental worms. Comparing the number of lipid droplets present in the gut epithelia of *C. elegans* can be indicative of an oxidative stress response, as a decrease in lipid droplets could be related to the inhibition of a mechanism similar to PPAR γ inhibition as an oxidative stress response within humans.

Mary Kabir

College of Veterinary Medicine
Faculty Advisor: Barbara Shock

Bartonella prevalence, diversity and associated risks in Appalachia

Abstract: *Bartonella* spp. are increasingly recognized reemerging intraerythrocytic bacterial pathogens of humans and animals. *Bartonella* infections can cause significant morbidity and mortality and diverse species are responsible for such diseases as Trench Fever (*Bartonella quintana*), Cat Scratch Disease (CSD, *Bartonella henselae*), and Oroya Fever/Verruga Peruana (*Bartonella bacilliformis*). More *Bartonella* species continue to be discovered annually. While many *Bartonella* spp. can be vectored by hematogenous arthropods (e.g., fleas, sand flies), some *Bartonella* can be mechanically vectored (e.g., CSD). The purpose of this study is to determine the prevalence and diversity of *Bartonella* spp. associated with cats, rodents and

fleas in the Cumberland Gap Region of Appalachia. Spleen from rodents as well as blood, claw and mouth swabs, and fleas from domestic cats were collected during LMU CVM projects and screened via PCR for the presence of *Bartonella* spp. Data collection is ongoing. Positive amplicons will be sequenced to confirm positive samples as well as determine *Bartonella* species. These data contribute to our growing awareness and knowledge of zoonotic pathogens in the Cumberland Gap Region of Appalachia.

Hannah Blevins

School of Mathematics and Sciences
Faculty Advisor: Barbara Shock

Occupancy of Allegheny woodrat and small mammals at rocky outcrops of Lilley Cornett Woods

Abstract: Rocky outcrops act as important habitats for various small mammal species, including Allegheny woodrats (*Neotoma magister*). Allegheny woodrat populations throughout the US have experienced declines due to factors such as habitat disturbance and fragmentation, hard mast decline, and infection with raccoon roundworm (*Baylisascaris procyonis*). This study was conducted to 1) identify rocky outcrop use by woodrats and other small mammals, 2) determine the occupancy status of Allegheny woodrats, and 3) assess the impact of disturbance on woodrat occupancy at rocky outcrops at Lilley Cornett Woods (LCW) in Letcher County, Kentucky. Woodrat occupancy was assessed via camera trapping conducted over 236 trap nights. Our results found that Allegheny woodrats were present at 61% of locations, indicating an extant Allegheny woodrat population at LCW. We found no correlation between woodrat occupancy and disturbance factors. This information will be used to update Allegheny woodrat distribution and inform efforts to understand their population dynamics.

Warren Dean, V.

DeBusk College of Osteopathic Medicine
Faculty Advisor: Adam Kolatorowicz

Analysis of implementing non-medical professional Glaucoma screening in a free medical clinic setting.

Abstract: Primary open-angle glaucoma is an asymptomatic disease that can cause irreversible blindness, that could be prevented if detected, diagnosed, and treated appropriately. Screenings should target patients with the highest risk factors for glaucoma and these individuals should be referred for treatment. In the free-medical clinic setting, glaucoma screening performed by non-medical professionals may be cost-effective if the necessary patients can be referred out to eye care professionals for additional follow-up. This is a proposal for a research study to identify the risk of patients developing glaucoma as well as the efficacy of a new screening and education program at a

free medical clinic in Knoxville, TN. IRB approval will be obtained. Statistical modeling will demonstrate the effect of age, sex, ethnicity, intra-ocular pressure, and co-occurring conditions on developing glaucoma. Surveys of patients and their medical records will provide a better understanding of the rates of eye disease, the use of eye exams, and the success of an education program in this unique sample. Predicted results will show that the newly developed program will decrease the incidence of primary open-angle glaucoma and demonstrate the financial and social impact of non-medical professional screening capabilities in a free clinic.

Sandra Frempong
School of Business

Accounting and Tax Reporting for Virtual Currency (Cryptocurrency)

Abstract: Virtual currency which includes cryptocurrency is a digital currency. Unlike a fiat currency, virtual currency is not backed by a government and is unregulated. It is issued and controlled by its developers. Virtual currency can be traded on an exchange, used, and accepted electronically as a medium of exchange among the members of a specific virtual community. As of 2021, about 18 to 21 million adults owned virtual currencies. With its popularity on the rise, the Internal Revenue Service (IRS), the SEC, and the courts are beginning to take actions against individuals who fail to stay in compliance with reporting requirements. Thus, the reporting enforcements of virtual currency is growing as well. Unfortunately, most individuals and practitioners do not understand the reporting obligations for virtual currency on tax returns. This presentation addresses the following questions:

- What is virtual currency?
- What are the current IRS reporting requirements on virtual currency?
- What to report and account for?

Petra Brnova
School of Business

Strategic Organizational Sustainability Climate: Scale Development and Validation

Abstract: Sustainability is a growing concern all around, and businesses, and organizations of all types including governmental agencies make all sorts of claims regarding their programs and their employees' involvement in such programs. Organizations must be able to substantiate claims they make using established tools instead of treating such claims as purely PR opportunities. The Strategic Organizational Sustainability (SOS) Climate scale was developed, validated and pilot tested in order to address some aspects of that need. The SOS Climate scale encompasses the employee perceptions of the

policies, practices, and procedures that promote long term organizational success in the era of pressing economic, social, and environmental challenges. This presentation will review the development, validation, pilot study and planned future research to help organizations embed triple bottom line (economic, social, and environmental) Sustainability into their strategic planning process.

Emma Cummings, Chrissy Bradley, Emily Roark, Lara Gunter, Sarah Long, Sarah Fultz, Kaitlyn Luster, and Mackenzie Amoureux
School of Arts, Humanities and Social Sciences
Faculty Advisor: Sandra Weems

Lincoln's Long-Lost Legacy: Lesser-Known Stories of Abraham Lincoln

Abstract: Following their recent academic trip to Washington, DC, eight Honors Scholars will make use of the city to examine some lesser-known facts and events from Lincoln's presidency. Focusing on three locations -- Fort Stevens, Lincoln's Cottage, and Ford's Theatre -- the presenters will use archival research, personal photographs, and historical images to link places and events from Lincoln's turbulent years in the capital. By exploring these historical places and their meanings, the presenters will introduce new perspectives of Lincoln's legacy to the Lincoln Memorial University community.

Poster Presentations

Audrey Burnette

College of Veterinary Medicine

Faculty Advisor: Lauren Wisnieski

The Retention of Equine Veterinarians Longitudinal (REVL) study

Abstract: In the last few decades, the number of graduating veterinarians pursuing equine practice has declined and many veterinarians are not staying in equine practice long term. Recognizing that there might be shortage of veterinarians in the near future, the Retention of Equine Veterinarians Longitudinal (REVL) study aims to investigate this decline by looking at factors associated with burnout, work satisfaction, and longevity in the field. The study is being conducted in three phases: focus groups, survey development and validation, and the full cohort study. The focus group interviews have been completed and qualitative data analysis is underway. The focus groups included equine vets that left practice, current equine vets, and students interested in equine practice. Recurring themes are being noted from the interviews, including work related stressors, mental well-being, physical struggles, and financial difficulties. The eventual goals of REVL are to aid the equine field by identifying areas where the industry can make changes to help equine veterinarians stay in practice and to identify ways to increase the number of graduating veterinarians entering equine practice.

Zurriat Syed

DeBusk College of Osteopathic Medicine

Faculty Advisor: Syed Quadri

Visual Health Impact of Online Learning During COVID-19 in Osteopathic Medical Students

Abstract: Objective: The purpose of this study is to determine if visual health in osteopathic medical students was impacted by online learning.

Methods: A retrospective questionnaire was emailed to Classes of 2023, 2024, and 2025. The survey was sent via email to 728 students through Qualtrics. A reminder regarding the questionnaire was emailed every week for three weeks. The National Eye Institute Visual Functioning Questionnaire was used to analyze the visual health outcomes. Incomplete surveys were included. Data variables were compared. ANOVA was used to analyze differences between genders and eye strain impact.

Results: There were 189 total surveys. This included 126 females and 63 males. 45.51% reported difficulty in reading text online and in print since COVID-19. 55% females reported increased eye strain compared to 29% in men. Gender was analyzed with ANOVA and the p value of

0.00036 showed a significant difference between groups.

Conclusions: Visual health outcomes are negatively influenced by online learning with gender being a significant factor. Due to the ongoing COVID-19 pandemic, we continue to be reliant on online learning and we must take precaution to preserve vision.

Nicolas Toma

DeBusk College of Osteopathic Medicine

Faculty Advisor: Stan Kunigelis

Blastodinium Parasitism of Estuarine Calanoid Copepods: Potential Population/Environmental Impacts.

Abstract: So, what does a parasitized copepod have to do with mankind? Plenty! Anything that alters copepod population dynamics will alter energy transfer from one trophic level to the next, until it reaches mankind at the top of the food pyramid! As such, the interconnected intricacies of energy flow from copepod to man can be altered by disturbances at any trophic level. As shown in these scanning electron microscopy photographs, various forms of the *Blastodinium* immature endoparasitic stage can be seen, from the smooth cystic structure to its rupture, revealing the dinospores contained within which will be expelled from the copepod gut in a fecal pellet. Parasitic inhabitation of the copepod species *Labidocera* by *Blastodinium* in various stages of development can be seen. Evidence of multiple parasites also suggests this to be the species *B. spinulosum*. Further evaluation of copepods for *Blastodinium* may help shed light on the limited knowledge of this species and the nature of its relationship with copepods, as well as its effects on copepod populations and the higher order consequences of its parasitism.

Tristan Lackey

College of Veterinary Medicine

Faculty Advisor: Lauren Wisnieski

Systematic Review on Work Satisfaction and Burnout in Human and Veterinary Medicine

Abstract: The purpose of the systematic review is to understand factors that influence work satisfaction and burnout in human and veterinary medicine. PubMed was searched for relevant articles using a search strategy informed by the Conservation of Resources theory and the Job-Demands and Resources theory. We used the following Boolean search string: ("burnout" OR "stress" OR "work satisfaction") AND ("veterinary" OR "medical professional" OR "physician" OR "doctor" OR "practitioner" OR "nurse"). Results were narrowed down to 1,738 records using the following filters: (1) Language = English; (2) Article Type = Clinical Study, Clinical Trial, Clinical Trial Veterinary, Controlled Clinical Trial, Evaluation Study, Observational Study, Observational Study Veterinary, and

Pragmatic Clinical Trial; (3) Year Range = 2000-2022; (4) Species = Humans; and (5) Age = Adult 19+ Years. The next step is to screen the titles and abstracts for relevance. At the conclusion of this systematic review, the results will be utilized to inform the study design of the Retention in Equine Veterinarians Longitudinal (REVL) study, which aims to understand factors associated with longevity in equine practice. Our long-term research goal is to develop interventions to increase interest, retention, and longevity in equine veterinary medicine.

Kristina Venditto

College of Veterinary Medicine

Faculty Advisor: Lauren Wisnieski

Burnout Among Equine Veterinarians

Abstract: Equine veterinarians are among some of the most at risk for burnout in the veterinary field. This study aims to identify some of the common themes related to burnout and work satisfaction among equine veterinarians that left practice. Participants were recruited through social media, listservs, direct solicitation, and other veterinary schools. There were two waves of recruitment and the 2nd wave prioritized the perspectives of BIPOC, LGBTQ+ identities, and members with disabilities. We conducted 1 - 1.5 hour semi-structured focus groups with 3-6 participants each via Zoom. Common themes related to burnout included struggling to feel like they “fit in” at some point in their equine career, being concerned for their safety while in practice, and feeling emotionally drained. Common themes related to work satisfaction included helping animals and people and getting to know clients. Participants that left practice left either due to more suitable opportunities (higher pay, more flexibility, safer) or because they experienced compassion fatigue and lost interest. Results of this study will inform the design of a larger cohort study that will assess factors associated with interest, burnout, and longevity in equine medicine.

Shohreh Kahhal

DeBusk College of Osteopathic Medicine

Faculty Advisor: Debasis Mondal

Co-exposure to nanomolar doses of the pharmaceutical drugs bardoxolone-methyl and bortezomib abrogates prostate cancer cell growth in vitro

Abstract: Background: Prostate cancer (PCa) is the second leading cause of cancer associated mortality in elderly men in the United States. Successful elimination of prostate tumors remains a challenge leading to the recurrence of aggressive PCa. Aggressively growing PCa cells rely on a highly regulated signaling crosstalk between the oxidative stress (Ox-stress) and endoplasmic reticulum stress (ER-stress) pathways. Therefore, we hypothesized that combined treatment with the pharmaceutical drugs bardoxolone-

methyl (CDDO-me) and bortezomib (Bort) which alter the Ox-stress and ER-stress pathways, respectively, would be highly effective in suppressing PCa growth.

Methods: Three PCa cell lines, i.e. LNCaP, C4-2B and 22Rv1, were used to measure the antiproliferative effects of CDDO-me (0-200 nM) and Bort (0-50 nM) alone and in combination. All three cell lines were purchased from American Type Culture Collection (ATCC) and grown in DMEM media containing 10% fetal bovine serum (FBS). Effect of drugs on cell viability at 72 h and 96 h post-exposure was measured by using the CCK-8 colorimetric detection kit (Sigma-Aldrich). Images of cells were captured using a CCD camera on a Leica microscope.

Results: In both LNCaP and C4-2B cells, exposure to nanomolar doses of Bort showed a dose-dependent toxicity. Although low dose CDDO-me did not show cytotoxicity, a dose-dependent increase was evident in cells co-exposed to Bort and CDDO-me (n=2). In C4-2B cells, almost 50% reduction in cell viability, as compared to control, was evident within 48 h post-exposure to CDDO-ME (100 nM) and Bort (25 nM) and as much as 70-80% reduction was evident at the 72 h and 96 h time points. Interestingly, in contrast to LNCaP and C4-2B cells, Bort was not as cytotoxic to the 22Rv1 cells, and a similar pattern of increased cytotoxicity following combination treatment was not evident in the 22Rv1 cells (n=1).

Conclusion: Preliminary findings indicate that simultaneous targeting of the Ox-stress and ER-stress pathways using low doses of Bortezomib and Bardoxolone-methyl may be effective in suppressing aggressive PCa cells. The 22Rv1 cells, which express multiple androgen receptor (AR) variants, may be inherently resistant to this treatment modality. Further mechanistic studies are warranted to understand the therapeutic potential of this combination treatment approach.

Talal Khan

DeBusk College of Osteopathic Medicine

Faculty Advisor: Debasis Mondal

Effect of bardoxolone-methyl (CDDO-Me) and dimethyl sulfoxide (DMSO) combination on prostate cancer cell growth and migration in vitro

Abstract:

Background: Prostate cancer (PCa) is a major cause of cancer-related deaths in elderly men. PCa cells utilize androgen receptor (AR) transcription factor to facilitate their proliferation and metastasis. Despite the initial success of androgen deprivation therapy (ADT), tumor progression to castration-resistant prostate cancer (CRPC) inevitably occurs. Metastatic CRPC (mCRPC) in the bone marrow dictates mortality in patients. Therefore, safe strategies to suppress AR expression in CRPC cells will be of significant benefit. Our previous publications showed that nanomolar doses of the triterpenoid compound, Bardoxolone methyl (CDDO-Me) can suppress AR levels in PCa cells. In

addition, we documented that subtoxic doses of the plant-derived organosulfur compound, dimethyl sulfoxide (DMSO) can also suppress AR levels in PCa cells. Both CDDO-me and DMSO alone were also shown to suppress PCa cell proliferation and migration in vitro.

Objective: We investigated whether a combination of lower doses of CDDO-me and DMSO can further downregulate proliferation and migration in the CRPC cell line, C4-2B. **Methods:** C4-2B cells were purchased from American Type Culture Collection (ATCC) and grown in DMEM media containing 10% fetal bovine serum (FBS). Cells were treated with CDDO-Me (50-200 nM), DMSO (0.5-2.5%) and a combination of both. Effect of drugs on cell viability at 48 h and 72 h post-exposure was measured by using the CCK-8 colorimetric kit. Scratch wound assays were done to quantify cell migration after 72 h of treatment.

Results: Exposure to low dose CDDO-Me or DMSO alone only slightly increased cytotoxicity in C4-2B cells, and coexposure to both agents did not further increase cytotoxicity. However, scratch-wound assays documented that 72 h exposure to CDDO-Me alone decreased cell migration, as evident by decreased wound-width. Low dose DMSO showed a slight stimulatory effect on cell migration, combination treatment led to a further decrease in C4-2B cell migration, as compared to CDDO-me alone.

Conclusion: Coexposure to subtoxic doses of CDDO-Me and DMSO decreased cell migration, possibly by suppressing AR levels. Since both CDDO-me and DMSO are clinically approved agents, this combination could be a novel strategy to suppress metastasis of CRPC cells. As a translational approach, a future strategy could be to utilize an intrarectal suppository that is a combination of these drugs to locally treat prostate cancer.

Kaleigh Cross-Brown

DeBusk College of Osteopathic Medicine
Faculty Advisor: Mary Beth Babos

Protocol and Internal Website Development for the Extraction and Evaluation of Herbal Substances

Abstract: The aim of this project is the creation of a tool to facilitate the design of protocols that outline extraction and evaluation of herbs and supplements for testing in Danio rerio. Output from the project includes not only a master protocol to guide protocol development, but also an internal website to enhance collaboration, provide efficient access to information and training, and offer a means for longitudinal evaluation of data. A peer assessment of the developed tools will be performed by collaborating researchers and presented; a link to the website will allow LMU Research Day participants to inspect the website and provide feedback.

Ashley Sundin and Haley Felts

DeBusk College of Osteopathic Medicine
Faculty Advisor: Mary Beth Babos

An Exploration of Bacterial Microbiomes in Eastern Tennessee Ambulances

Abstract: When patients develop new-onset infections after hospital admission, the origin of the infection is typically assumed to be nosocomial; however, ambulances are potentially unexplored reservoirs for emerging pathogens. This study seeks to identify the scope of bacterial contamination in rural East Tennessee ambulances. Though universal precautions and cleaning procedures aim to reduce the spread of infectious diseases to provider and patient, little is known about the bacterial microbiome of ambulances. Our dissemination of post-pandemic findings may impact ambulance sanitation measures and will add to the national and global knowledge pertaining to the microbiome of emergency medical patient transport systems. At least one active ambulance unit for each EMS service underwent sampling. Three samples were obtained from each of three areas: the floor of the ambulance transport area, the rear door panel inside the transport area and stretcher. The results from bacterial identification showed all flora were human commensal flora or environmental flora. The flora found on ambulance doors and stretchers also had opportunistic capabilities. In this era of increasing antibiotic resistance, it is concerning that several microbes with pathogenicity were found. Overall, the finding of numerous diverse colonies does not support adequate sanitation of the ambulances.

Sidney Harrison and Megan Rochford

DeBusk College of Osteopathic Medicine
Faculty Advisor: Natalie Freeman

Role of a Flavonoid In Mouse Melanoma Cells

Abstract:

Background: Chrysin is an active natural bioflavonoid found in honey and many plant extracts. It is known to have antioxidant and anti-inflammatory effects. Chrysin has been shown to have inhibitory effects against cancer.

Objectives: To investigate the optimal concentration of Chrysin as an effective treatment option for melanoma.

Methods: B16-F1 cells were cultured and treated with different Chrysin concentrations for 24, 48 and 72 hours. Cell viability was quantitated by TACS® MTT Cell Proliferation Assay (R&D Systems).

Results: The MTT assay showed that Chrysin had an anti-proliferative effect at 20uM for 48 and 72 hours.

Conclusion: Flavonoids such as Chrysin could be a promising and cost-effective treatment for skin melanoma.

Andrew Kleehammer

DeBusk College of Osteopathic Medicine

Faculty Advisor: Milan Sheth

A Novel Finding of Isolated Parachute Mitral Valve and Left Ventricular Non-Compaction Presenting as New Onset Cardiomyopathy in an Adult Patient

Abstract: Left ventricular non-compaction (LVNC) and parachute mitral valve (PMV) are rare congenital heart defects. LVNC describes an incompletely formed ventricular myocardium causing a sinusoidal appearance known to cause non-ischemic cardiomyopathy. PMV describes a mitral valve with chordae tendineae inserting into a single papillary muscle creating a parachute like appearance. 55 y/o male with history of drug abuse, hypertension and CAD presented to the ED with chest pain and dyspnea. Evaluation in the ED showed evidence of CHF without evidence of ischemia. The patient was started on anti-hypertensives and diuresis. The following day an echocardiogram showed LVH, areas consistent with LVNC, hypokinesis of the left ventricle with EF of 40-45%, and PMV. LVNC and PMV have been reported as isolated congenital heart defects and with additional defects. The most common defect reported with LVNC is left ventricular outflow obstruction. PMV was first reported with Shone syndrome which is a constellation of a supra mitral valve, PMV, subaortic stenosis, and coarctation of the aorta. PMV is more commonly reported in children requiring surgical correction. The most common associated lesion is coarctation of the aorta. This unique presentation of isolated PMV with LVNC warrants further consideration in cases of non-ischemic cardiomyopathy in adults.

Hannah Roland and John Holland

DeBusk College of Osteopathic Medicine

Faculty Advisor: Natalie Freeman

Role of Chrysin in Human Pancreatic Cells

Abstract: Background: Chrysin (5,7-dihydroxyflavone) is a naturally occurring polyphenol present in many plants as well as honey. It has been proposed to have inhibitory effects against several cancers such as pancreatic adenocarcinoma.

Objectives: To investigate the optimal concentrations of Chrysin as a treatment option for pancreatic adenocarcinoma.

Method: Pancreatic cell lines BxPC-3, AsPC-1, PANC-1 were treated with Chrysin at concentrations of 5uM, 15uM, 20uM. MTT Cell Proliferation assay (R&D Systems) was utilized to quantify cell viability after 24- and 48-hour Chrysin treatment.

Results: Of the 3 cancer cell lines, only BxPC-3 exhibited a decrease in cell viability after 24 hours of chrysin treatment. The AsPC-1 and PANC-1 failed to demonstrate an antiproliferative effect at any tested dose. In fact, PANC-1

showed a marked increase in viability at higher doses.

Conclusion: Chrysin may be a promising and cost-effective treatment in pancreatic cancer that does not harbor KRAS mutation.

Future Research: Plan for spring 2022 is to run additional MTT assays with additional concentrations. Flow will also be incorporated to investigate signaling pathways post treatment.

Jonathan Guihurt

DeBusk College of Osteopathic Medicine

Faculty Advisor: Chloe Ruff

Quantified Exposure to Clinical Procedures by Rotation Setting in the OMS Third and Fourth Years

Abstract: Competence in performing hospital-based procedures is essential for high-quality patient care. Medical boards have established a minimum number of times specific procedures should be performed reach a level of competency. There is evidence to suggest greater exposure to a skill results in efficient training to a level of competency and improved performance outcomes. However, there may be variable experiences among medical trainees in how much exposure to procedures they have depending on the rotation sites, specifically between urban and rural settings. The purpose of this study is to assess exposure to clinical procedures in third and fourth year training years. A survey was released to third and fourth year osteopathic medical students for a period of four weeks in order to gather data. Analysis will control for variables such as number of rotations completed and will include a comparison of urban and rural settings. Outcomes may support future student mentoring in preparation for clinical year and for planning of didactic education that aligns with common experiences in the clinical training years.

Amar Bukvic

DeBusk College of Osteopathic Medicine

Faculty Advisor: Debasis Mondal

Melittin and its synthetic analogs show decreased hemolytic activity in serum: a crucial observation to facilitate their translation as novel antibacterial agents

Abstract:

Background: Emergence of multidrug resistant (MDR) bacteria poses a significant global threat. New antimicrobials are being investigated to discover agents less susceptible to rapid resistance development. In this respect, Melittin, has shown potent bactericidal effects via a novel target. However, a barrier to the clinical translation of Melittin has been its hemolytic activity on red blood cells (RBCs) in vitro. Studies using synthetic Melittin analogs are also being investigated, to identify analogs with decreased hemolytic activity and increased antibacterial effects.

Materials & Methods: Effect of Melittin on bacterial growth

was measured by turbidometry in liquid cultures and colony forming units (CFU) in agar plates. Hemolytic activity of Melittin, and its analogs, in either phosphate buffered saline (PBS) or 10% FBS containing media, were measured by spectrophotometry (OD 600 nm).

Results: Exposure to increasing concentrations of Melittin, and its analogs, showed RBC lysis within 1 hr. However, hemolysis was significantly lower in presence FBS (20% and 60%) as compared to PBS. Several of the Melittin-analogs showed lower hemolysis as compared to Melittin. At these sub-hemolytic concentrations, Melittin showed considerable antibacterial effects, as seen by decreased turbidity and CFUs. Furthermore, Melittin exposure increased the antibacterial efficacy of low dose antibiotics.

Paula Miksa and Stephanie Conder

School of Medical Sciences

Healthcare Literacy and Interprofessional Telehealth Considerations

Abstract: Program accreditation standards require that programs must prepare students to provide medical care to patients with consideration for social determinants of health and to work collaboratively in interprofessional patient centered teams. An essential member of the patient centered team is the patient and with the onset of COVID-19, we have seen a decline in the ability of patients to access health care in traditional ways. Telehealth is one way to improve access to care. This project provided students with an opportunity to analyze the impact of social determinants of health including culture, language, and health literacy, along with Interprofessional telehealth considerations, as they pertain to continuity of care and the patient's ability to make and implement health-related decisions across multiple levels of patient-centered care. Students from six health care disciplines participated in three synchronous virtual sessions that utilized a progressive simulated case study of a standardized patient and one synchronous virtual debrief. Completion of the program (n= 227) led to an increase in knowledge of all educational learning objectives and IPEC competencies.

Misti Lopez

School of Allied Health Sciences

Faculty Advisor: Amanda Rainey

Life Expectancy in Dogs with Stranger-Directed Fear Compared to Dogs with Separation Anxiety

Abstract: Behavior issues in dogs can influence their lifespan and quality of life. Dogs suffering from either separation anxiety or stranger-directed fear are experiencing issues related to fear and anxiety and if undressed, it can impact their life and their owner's life. Life experiences and lifestyle can influence the occurrence

of these anxiety disorders which commonly affect young dogs. There are profound health implications associated with separation anxiety and stranger-directed fear which are important to address as they can reduce a dog's lifespan. This prospective cohort lifetime study aims to follow 500 dogs of varying ages between 8 months to 1.5 years. Owners will provide information through questionnaires and surveys and researchers will obtain information about patient/owner demographics. Additionally, serum Brain-derived neurotrophic factor (BDNF), and Telomere length will be measured in enrolled dogs. All information provided will be used to determine how the lifespan of pets with the disorders discussed is impacted. The study is concerned with a decrease in life expectancy in dogs with stranger-directed fear compared to dogs with separation anxiety.

Briana Meredith

School of Allied Health Sciences

Faculty Advisor: Matthew Marcum

The Effects of Hydrotherapy Verses Therapeutic Therapy for Canines with Degenerative Myelopathy

Abstract: Canine Degenerative Myelopathy (CDM) is a progressive neurodegenerative spinal cord disease. This disease is mostly seen in larger dog breeds, ages 8 and up. Canine degenerative myelopathy is caused by white matter of the spinal cord degenerating. Other studies have been able to identify that physical therapy and rehabilitation result in a slower progression of degenerative myelopathy. However, there are very few studies that examine whether mobility is improved in canines with degenerative myelopathy. Mobility can be examined by observing the stance and gait of the canine. In addition, to compare rather a canine's mobility is improved, this study will use different variables such as water and different surface areas. In order to obtain a reliable analysis of increased mobility, this cohort study is completed by a set staff with canines that meet specific requirements. This study will examine whether hydrotherapy or therapeutic therapy is best for increasing mobility in dogs with canine degenerative myelopathy.

Cana Short

School of Allied Health Sciences

Faculty Advisor: Jay Miles

Baylisascaris in Raccoons found in Urban and Rural Areas

Abstract: Raccoons are hosts for Baylisascaris infection which is a roundworm that can infect humans and other species. The roundworms are shed through the feces and is transmitted through ingestion (Appendix I). This can affect younger children who are careless when playing in dirt that can be contaminated with racoon feces. This study is case series research to see how many raccoons in different areas (urban and rural) have B. Procyonis. This will be tested by

necropsy on the raccoons who will be collected in each location in the rural and urban areas. There was research on the different areas, the author mentioned that there are more raccoons infected with the roundworm in the rural areas than in the urban, because of the intermediate hosts as a food source is decreased dependence (Paige, 2008). This roundworm can cause neurological effect on humans that can stay permanent.

Macee Zaffiro

School of Allied Health Sciences
Faculty Advisor: Dr. Bonnie Price

Dogs with separation anxiety

Abstract: Due to changing times, dogs are being diagnosed with separation anxiety because, in veterinary medicine, mental health in animals is diagnosed more. Many shelters adopted dogs have been diagnosed with separation anxiety because their owners left them in a strange place, which caused them to feel abandoned. During the recent pandemic, there was a lot of adoption of dogs who suffer from separation anxiety. During the lockdown, they spent many hours with their new owners. Many dogs could lessen their medication dose because they were spending more time with their new owner. There has been a rise in medication for separation in recent times because people are no longer working from home. Medications like Clomipramine and Fluoxetine can help reduce separation anxiety and stress-inducing situations. This intended cross-sectional study intends to determine if spending more time with dogs that have canine separation anxiety can lessen the clinic signs used to diagnose mental illness. Using the Lincoln Canine Anxiety Scale and a mail-out survey at select veterinary clinics allows the measurement of separation anxiety and if it is inhibiting the dog's quality of life.

Autumn Sharp

School of Allied Health Sciences
Faculty Advisor: Jay Miles

Prevalence of Mycoplasma Wenyonii in Cattle in Central Appalachia

Abstract: Mycoplasma wenyonii is a hemotrophic, epicellular bacteria parasite of cattle that has been associated with clinical disorders, including hemolytic anemia, ill-thrift, lymphadenopathy, diarrhea, infertility, scrotal and hind limb edema, swollen tears, weight loss, and reproductive inefficiency. M. wenyonii and a related organism, Candidatus Mycoplasma haemobos, have been detected in both ill and apparently healthy cattle, but little is known about their prevalence in United States cattle. By using the state extension offices, herds/operations will be selected at random and mailed a postcard with information. Samples will be obtained by state diagnostic personnel

that will then conduct a PCR test. The objective of this prospective cross-sectional study is to determine herd-level apparent prevalence of M. wenyonii and C. M. haemobos in cattle located in Central Appalachia.

Kailey Spann

School of Allied Health Sciences
Faculty Advisor: Dr. Bonnie Price

Grain Free Diets vs Dilated Cardiomyopathy

Abstract: Dilated cardiomyopathy or DCM is a disease that affects the cardiac muscles and affects the way that blood pumps through the body. This study will evaluate the risk that grain free or raw meat diets have on developing dilated cardiomyopathy in large breed dogs. There have been some studies done, that are pertaining to this issue but most have only been studies on certain breed of dogs such as all golden retrievers or all labradors were in the experiment. The purpose of this experiment is to see if grain free diets increase the risk of dilated cardiomyopathy in large breed dogs. This will be considered a case control study. Data in this experiment will be used from a variety of large breed dogs with assortment of diets. One hundred dogs will be chosen based on their health. Fifty will be chosen that have been diagnosed with dilated cardiomyopathy while the other fifty will be considered healthy dogs with no known heart issues. Case files then will be examined for certain diets to calculate the risk of grain free diets leading to dilated cardiomyopathy.

Kristina Emmette

School of Allied Health Sciences
Faculty Advisor: Heather Bhakta

Quality of Life Measured After Lymphoma Chemotherapy in Felines Treated With Prednisolone as Pre-treatment

Abstract: Lymphoma in felines is a systemic cancer affecting lymphocytes, a type of white blood cell important for the animal's immune system. 30% of cancer diagnoses in felines is lymphoma. A cohort study will be performed using felines diagnosed with lymphoma to determine if there will be a decrease in the quality of life (QOL) in felines with lymphoma given prednisolone before their chemotherapy treatment. The felines in the groups will be selected from five different veterinary oncologists across East Tennessee who had intermediate or high-grade lymphoma. They will be separated into four groups, with four participants in each group. Participants will be excluded if they have any other underlying health issue, such as feline leukemia. All groups will be given the same chemotherapy treatment protocol and will be followed for the next 6 months to measure their quality of life. Two groups will be given prednisolone as pretreatment, and the other two groups will not. Owners of patients will be given a take-home questionnaire to document their pet's QOL before and after their treatment.

At the end of that 6 months, the participants will go to their primary veterinarians, where their questionnaires and health will be assessed.

Kiley Holmes

School of Allied Health Sciences
Faculty Advisor: Matthew Marcum

The Human Animal Bond's Affect on Nightmares Caused by PTSD

Abstract: PTSD is a complex condition that encompasses many different symptoms and can affect anyone regardless of sex or age. The condition can arise when there is any significant trauma in a person's life. The symptoms can range from anxiety, irritability, depression, flashbacks, and nightmares. Animal assisted therapy is a non-conventional way to help reduce PTSD symptoms. There have been multiple studies looking at the health benefits that dogs provide PTSD patients, and they all find an improvement in symptoms and higher quality of life. This study focuses on the reduction in nightmares from having an attachment to pet to see if this is a valid treatment. The reduction of nightmares will be measured from a 1-5 scale on a self-made survey that is emailed out to the participants and a score of 4 or 5 will be considered a reduction of nightmares.

McKaelyn Hatmaker

School of Allied Health Sciences
Faculty Advisor: Matthew Marcum

Stem Cell Therapy in Canines with Chronic Spinal Cord Injuries

Abstract: Spinal cord injuries are a devastating disease in dogs that can result in multiple complications. In many cases, euthanasia is a top choice for those who suffer from spinal cord injuries. Regenerative medicine using stem cell therapy is being evaluated for various types of neurological diseases that have poor prognosis. Prior research has been conducted and supports the idea that mesenchymal stem cells have been beneficial in the recovery of acute spinal cord injuries. However, few studies have been done evaluating chronic spinal cord injuries using stem cell therapy. The purpose of this study is to evaluate the benefits of stem cell therapy in dogs who suffer from chronic spinal cord injuries. A prospective cohort study will be performed comparing use of mesenchymal stem cell therapy in patients with chronic spinal cord injuries to traditional therapy options.

Lindsay Horton and Gage Keck

School of Mathematics and Sciences
Faculty Advisor: Clint Field

Prevalence of and attitudes of Vaping among students at LMU

Abstract: The primary goal of this research was to gauge the prevalence of electronic cigarette usage among Lincoln Memorial University's undergraduate population. An online survey was utilized to gather information on undergraduate students regarding personal experiences with electronic cigarettes. The survey included questions on initial exposure to electronic cigarettes, length of exposures, and general accessibility to electronic cigarettes. This survey was sent to staff who teach Lincoln classes, who further administered the survey to Lincoln Memorial University undergraduates. The data from the survey was then organized and analyzed.

Caitlyn Lindell

School of Mathematics and Sciences
Faculty Advisor: Thomas Shell

Synthesis of a Vitamin B-12 Conjugate with a Mitochondrial Localization Peptide

Abstract: Free radicals are known to cause damage to biological systems and this damage is thought to be the cause of aging. However, it is not well understood how the localization within cells of oxidative damage via radicals impacts cellular function. Therefore, molecules that can localize radical damage to specific cellular organelles would be valuable for studying cellular function impairment resulting from oxidative damage. Hydroxocobalamin is a Vitamin B12 derivative that generates hydroxyl radicals upon exposure to certain light wavelength. This light-controlled reaction allows for spatial and temporal control of radical generation. To assess this control, hydroxocobalamin will be conjugated to a peptide-based mitochondrial localizations sequence (MLS). The MLS will then be synthesized using standard solid-phase peptide synthesis. Following the synthesis, the hydroxocobalamin-MLS conjugate will be incubated with isolated mitochondria to demonstrate its ability to impair activity of mitochondrial-bound enzyme using commercially available assays. The specific enzymes that will be assessed are citrate synthase, monoamine oxidase, and cytochrome C oxidase.

Jasmyne Thomas

School of Mathematics and Sciences
Faculty Advisor: Stephen Everly

The Potential Antimicrobial Activity of Acetylferrocene

Abstract: Upon the synthesis of acetylferrocene from its parent compound, ferrocene, I will be analyzing

acetylferrocene's potential antimicrobial activity against a gram-positive bacteria (Staphylococcus) and a gram-negative bacteria (Escherichia coli).

McKinley Burns

School of Allied Health Sciences
Faculty Advisor: Amanda Rainey

Improvement of Depression with Dog Adoption

Abstract: With the pandemic still upon us, there has been a rise with the cases of depression. There has been a major increase in the number of cases that we have seen with depression. Many of which, had already been diagnosed with depression, but the amount of time spent alone has made the symptoms worse. The number of animals that were adopted increased more and more throughout the pandemic. This study will see if people with depression had a decrease in their symptoms after they adopted a dog. This will let the people know whether getting a dog during COVID-19 was a clever and how the people had better symptoms after the dog was adopted. There will be a time restraint of 8 months and before the pandemic started. There will also be a survey used to see if symptoms got better or worse after adopting a dog.

Jun Wang & Marissa Viola

DeBusk College of Osteopathic Medicine

Concurrent p53 mutation in EGFR mutant non-small cell lung cancer is associated with resistance to first and second generation EGFR tyrosine kinase inhibitors, a meta-analysis
Abstract: Epidermal growth factor receptor (EGFR) mutant lung cancers tend to respond well to EGFR tyrosine kinase inhibitors (TKIs). However, resistance has been described. Molecular studies have revealed that concurrent mutations of tumor driver genes are associated with TKI resistance. To delineate the role of concurrent mutation of tumor suppressor gene p53 in TKI resistance, a meta-analysis was performed using published observations of EGFR mutant lung cancer patients treated with first or second generation TKIs. 31 studies are included in the analysis following a search of PubMed. Probability of TKI resistance and progress free survival (PFS) were compared in patients with or without p53 mutation. An increased probability of TKI resistance is seen in p53 mutant lung cancers. Interestingly, when resistance is defined as PFS<6 months, there is insignificant increase of resistance in p53 mutant patients (OR=1.93, 95% CI [0.38, 9.85], p=0.43). When resistance is defined as PFS<4 months there is a marked increase in resistance (OR=20.16, 95% CI [2.61, 155.75], p=0.004). In addition, p53 mutation is associated with a significantly shortened progress free survival in these patients (HR=1.57, 95% CI [1.26, 1.97], p<0.0001). These findings suggest that p53 mutation is associated with resistance to TKIs in EGFR mutant lung cancers.

Jeremy Turner

School of Business
Faculty Advisor: Dr. Sandra Frempong

The impact of psychological needs on the organizational commitment of employees who work from home.

Abstract: This research is focused on understanding the relationship between an employee's basic psychological needs for motivation (needs for autonomy, competence, and relatedness) and the three components of organizational commitment (affective, continuance, and normative commitment) in a work from home context.

Kayla Medlin

College of Veterinary Medicine
Faculty Advisor: Lauren Wisnieski

Outcomes of cats and dogs adopted during the COVID-19 pandemic

Abstract: Pet owners may experience many benefits from adopting a dog or cat during the COVID-19 pandemic, such increased social support and a new sense of purpose. However, in some cases owners may not have considered the long-term welfare needs of the animal and have not prepared for returning to work. Additionally, financial hardships acquired during the pandemic, such as unemployment, may result in difficulty providing proper care for pets. The aim of this proposed study is to evaluate the welfare outcomes of dogs and cats acquired during the COVID-19 pandemic through a longitudinal cohort study. Data will be collected through a Qualtrics survey and will be administered to adults residing the U.S. that have adopted a dog or a cat since the start of the COVID-19 pandemic. The owners will be followed up at 6 months and again at 1 year to determine the welfare outcomes of the pet. Welfare will be measured through the measurement of health outcomes (vaccine status, weight, preventative care), behavioral outcomes (aggression, separation anxiety), and ownership status (i.e. still with owner, surrendered, re-homed, or other ownership outcome). Results from the study can be used to inform adoption procedures for shelters and breeders.

Hannah Sherrod and Jetta Brady

School of Medical Sciences
Faculty Advisor: Lori McGrew

Developing a Program of Research to Assess the Anxiolytic Properties of Appalachian Herbs in Danio rerio

Abstract: The primary aim of this project is to develop a standard laboratory procedure to assess the activity of native Appalachian herbs using Danio rerio. In accordance with a tool developed by a collaborating team, we will also evaluate a procedure to extract constituents from Hypericum perforatum and Passiflora incarnata.

Chromatography including high performance liquid chromatography and thin layer chromatography will be used. The efficacy of fractionated extracts will be assessed in *Danio rerio*, a species of zebrafish that has been used extensively for behavioral studies. Behavioral tests that could be used include the novel dive tank for assessing anxiety. In this assay, zebrafish treated with herbal extracts are compared to control fish with respect to vertical position in the tank. Percentage of time spent in the lower portion of the tank is a measure of anxiety and can be used to quantify the anxiolytic properties of Appalachian herbs. Other tests, such as the T-maze, can provide additional information about the activity of the herbs for improving working memory. Establishing this program of research with appropriate protocols will allow the reproducible evaluation of Appalachian herbs in our preclinical model; thus, a secondary aim is to evaluate the website and master protocol.

Bhavik Patel and Gursimran Udhwani
DeBusk College of Osteopathic Medicine
Faculty Advisor: Natalie Freeman

Melanoma in Dermatological Care in Appalachia

Abstract: Cancer is one the second leading causes of death, followed behind heart disease, within the United States. One particular area that is afflicted the most in terms of higher mortality rates is the Appalachian region, in comparison the national average. Specifically, Melanoma of the Skin is elevated in terms of development and cause of death for the people of this region. A big factor to consider why this is the case is due to the health disparities that Appalachians face. Certain factors, from economic, education to environmental are a few of the reasons why we have so many negative implications to health within this population. A type of cancer that is easily avoidable with the right amount of preventable care and reduced amount of exposure to harmful matter, whether chemicals or ultraviolet light radiation. This review will go into the facets of dermatological health in terms of melanoma incidence and mortality through health disparities that the Appalachian people suffer from. To summarize, environmental hazards can wreak havoc on the largest organ of occupational workers: The Skin. It must be protected through the usage of sun barriers, long pants, hats, and sunscreen to name a few in addition to trace elements such as Arsenic. Extensive measures need to be taken at places of work in order to bring awareness on the importance of skin health. In addition, physician counseling and guidance must be essential in order to increase the health access and literacy of the residents of rural Appalachia to better understand the signs and symptoms of suspicious lesions. It is essential to also acquire health education regarding the genetic component behind melanomas, especially to those occupational workers who

are at an increased risk.

Katherine Kirkendall and Madison Criswell
College of Veterinary Medicine
Faculty Advisor: Karen Gruszynski

Infectious Diseases of Cats in Kentucky, Tennessee, and Virginia

Abstract: The objective of this study was to determine the prevalence of common feline parasites and other infectious diseases from shelter and community cats from neighboring portions of Virginia, Tennessee, and Kentucky. Blood and fecal samples from both groups were tested using IDEXX real-time PCR assay anemia panel and centrifugal flotation, respectively. Parasites were identified using morphological criteria. FIV (1/62=1.6%), FeLV (1/62=1.6%), and Bartonella spp. (2/62=3.2%) were identified only in community cats. Eleven blood samples (11/62=17.7%) were positive for Mycoplasmas, one (1/16=6.3%) from a shelter cat and ten (10/46=21.8%) from community cats. All blood samples were negative for Anaplasma spp., Cytauxzoon felis, and Erlichia spp. Parasites Toxocara cati (14/75=18.7%) and Ancylostoma tubaeforme (4/75=5.3%) were only in community cats. More shelter cat fecal samples were positive for Cystoisospora spp. (4/25=16%) compared to community cats (2/50=4%), while Dipylidium caninum was more prevalent in shelter cats (2/25=8%) compared to community cats (3/51=5.9%). All fecal samples were negative for Capillaria sp. and Aleurostrongylus abstrusus. Community cats presented a wider range of pathogens and parasites, and due to roaming behaviors may be more likely to pose a potential health risk to both cats and humans.

Kaitlin Sons and Jonathan Guihurt
DeBusk College of Osteopathic Medicine
Faculty Advisor: Brent Thompson

Bilateral Anotia and Common Co-morbidities: A Case Study of a Human Donor

Abstract: Anotia, the complete absence of the external ear, occurs at a rate of ~2.6 per 10,000 births and is often associated with other congenital syndromes. Here we present preliminary findings of an anatomical donor with bilateral anotia and a single bone anchored-hearing aid. Resected temporal bones were scanned using a Nikon XTH 225 ST Cone Beam Micro-CT scanner to generate data sets with a resolution of 26.7 microns. Data sets were used to produce anatomical diagrams and measurements. Biopsies of the kidneys were collected to perform histological studies. Anotia was observed bilaterally with no external opening of the external acoustic meatus. Dissection revealed the presence of atretic external acoustic meatus covered with connective tissue bilaterally. Preliminary qualitative analysis of inner ear scans showed unusual curvature of the semicircular canals, ongoing studies will measure dimension and volumes of the semicircular canals and

the cochlea. Examination of the donor also revealed the presence of a transplanted kidney and apparent bilateral atrophy of the donor's kidneys. Kidney biopsies were collected and will be assessed for pathologies. The findings of this case report will contribute to providing clinicians with a better understanding of anatomical and histological changes associated with anotia.

Lydia Murray and Jaresiah Williams
College of Veterinary Medicine
Faculty Advisor: Lauren Wisnieski

Impact of human-animal bond on mental health and pet preventative care

Abstract: Many studies have established the negative impact of COVID-19 on mental health, but few studies have investigated the effect of pet ownership during the pandemic. Pet ownership has been shown to increase aspects of well-being but may also be a source of stress due to factors such as a financial constraints and illness. This study aimed to evaluate how the strength of the human-animal bond (HAB) affects mental health, resiliency, and pet preventative care (adherence to vaccinations, exams, heartworm medication, and flea-tick preventative). An online survey was distributed via Qualtrics in Summer of 2021. Survey invites were sent out to households in the 10 counties of the Cumberland Gap region and posted in veterinary clinics and other local businesses. Data were analyzed in SPSS using independent t-tests and chi-square tests to determine differences in mental health and pet preventative care between owners with high versus low HAB. In total, 34 participants completed the survey. Preliminary results show no demographic differences between high versus low HAB groups. Further analyses will determine differences in mental health and pet preventative care. The results of this study will highlight how the HAB affects aspects of human and animal health.

Meaghan Kuzmich and Cambri Fox
DeBusk College of Osteopathic Medicine
Faculty Advisor: Lori McGrew

Qualitative Survey of Dance for Parkinson's Participants in Rural Appalachia

Abstract: Our local community in rural Appalachia has historically lacked access to quality public health programs and as a result has higher rates of disabling medical conditions. The basis of this project is to assess what knowledge the community has about ways they can support their body through neurodegenerative diseases such as attending Dance for Parkinson's (Dance for PD) classes. Data will be collected using a twelve-question qualitative survey of the individuals who attend a Dance for PD class at the Harrogate Senior Center in April 2022. In addition to assessing the knowledge of the participants as mentioned

above, questions to gauge their interest in having more access to classes such as Dance for PD were also included. This project aims to explore how our community could benefit from regular access to programs such as Dance for PD by identifying specific gaps in health literacy and the perceptions of the local community.

Stacie Williams
College of Veterinary Medicine
Faculty Advisor: Charles Faulkner

Dog Owner Use and Perceptions of Canine Heartworm Prophylaxis for Prevention of Canine Heartworm Disease
Abstract: Canine heartworm disease (CHWD) is caused by infection with the nematode parasite *Dirofilaria immitis* transmitted through the bite of a mosquito carrying the infective stage larva. The disease is insidious in its onset and 100% preventable with the use of highly effective pharmaceutical compounds that target the migrating larval stage acquired from the mosquito. Previous research conducted in the Cumberland Gap Region (CGR) indicated approximately 40% of dog owning individuals do not make use of these prophylactic products. In this study, we surveyed pet dog owners across the United States from October-February to determine reasons for the use or non-use of canine heartworm prophylaxis to prevent CHWD. Results of 312 responses were analyzed from 31 states in the Northeast, Mid-Atlantic, Southeast, Southwest, Mid-West, and Northwest regions of the United States (US), including Puerto Rico (PR). Pet dog owners in the US chose not to give their pets CHW prophylaxis for economic reasons (45%), environmental factors (20%), low perceived risk of CHWD (10%), or subscribe to beliefs associated with a holistic approach to prevention (7.5%). These results allow veterinary professionals to address the educational techniques of heartworm prophylaxis and disease to increase their use and gain better rapport with patients.

Blaine Marie
DeBusk College of Osteopathic Medicine
Faculty Advisor: Stacy Chelf

Dexterity in Healthcare Students: Lessons Learned and Changes Implemented

Abstract: This study sought to examine the effect of knitting on dexterity and self-efficacy regarding surgical skills. Participants completed pre-surveys to examine prior experience in manual skills and confidence, and dexterity was measured using the Purdue Dexterity Test. One study participant engaged in eight 90-minute sessions of formal knitting instruction. A paired samples t-test was performed, indicating that knitting did not have a significant influence on dexterity ($t = 0.198$; $p > .05$), but her perceived dexterity improved with the intervention. These results yielded a stimulating discussion regarding the limitations of this pilot

study and design alterations to implement in an upcoming study investigating relationships among hand-tying, dexterity, and surgical confidence.

Nicolas Townsend and Jeffrey Martin

School of Medical Sciences

Faculty Advisor: Dr. Jeffrey Martin

The influence of different target inflation pressures on physiological outcomes associated with external counterpulsation (ECP)

Abstract: External counterpulsation (ECP) is typically prescribed at a single target inflation pressure (~5-5.5psi) which limits accessibility. We sought to compare the acute effect of varied ECP target inflation pressures on brachial and carotid artery blood flow as well as change in aortic blood pressure (BP), brachial artery BP, nitric oxide metabolites (NOx), and brain derived neurotrophic factor (BDNF). 10 apparently healthy males participated, and each completed two 30-min familiarization sessions with progressive increases in target inflation pressure (0.5-2.5 psi at FAM1, 0.5-5.0 psi at FAM2). Thereafter, each participant was assigned a random sequence of 30-min treatments (0.5psi, 1.5psi, 3.0psi, 5.0psi) separated by 1-week. Blood flow was assessed via duplex ultrasound prior to and during each treatment. BPs, NOx and BDNF were measured pre- and immediate post-treatment. No significant changes nor differential responses were observed for NOx and BDNF. Brachial and aortic diastolic BP values were progressively and significantly increased with increasing target inflation pressures. Blood flow values were found to vary significantly with differing target inflation pressures, particularly the retrograde component. Moreover, blood flow changes differed significantly between the carotid and brachial arteries. There is significant physiological impact of ECP with lower than traditional target inflation pressures.

Hannah Blevins

School of Mathematics and Sciences

Faculty Advisor: Barbara Shock

Prevalence and diversity of Ehrlichia spp. from Ixodid ticks in the Cumberland Gap Region of Tennessee, Kentucky, and Virginia

Abstract: Ehrlichia spp. are transmitted to animals and humans through the bite of an infected Ixodid tick, particularly bites from Amblyomma americanum and Ixodes scapularis. The main three species of Ehrlichia that affect humans in the United States are E. ewingii, E. chaffeensis, and E. muris eauclairensis; however, novel species continue to be discovered. Ehrlichiosis can result in fever, aches, nausea, as well as mortality. Humans, domestic animals, and wildlife are vulnerable to infection. This study will screen over 2900 tick DNA samples from

the Cumberland Gap Area of Tennessee, Virginia, and Kentucky via polymerase chain reaction. These tick samples were collected from 2016-2020 and contain the genera Ixodes, Amblyomma, Dermacentor, and Rhipicephalus. Positive amplicons will be sequenced to determine the species of Ehrlichia. These data will contribute to our growing knowledge of tick-transmitted diseases in Appalachia as well as the diversity of Ehrlichia spp. in the United States.

Sinclair Conley

School of Allied Health Sciences

Faculty Advisor: Heather Bhakta

Evaluating Weight Status of Dog Owners as a Possible Weight Predictor for their Dogs

Abstract: Excess fat accumulation is a known risk factor for developing serious noncommunicable diseases such as cardiovascular disease and musculoskeletal issues. Rates of overweight status and obesity are on the rise in both humans and pets, increasing the risk for disease and endangering the quality of life. A cross sectional study of 1000 owners and their dogs from a 1-hour radius of University of Tennessee Knoxville will be analyzed to determine if there is an association between the weight status of the owner and the weight status of their dog. The weight status of owners and their dogs will be initially scored by Body Mass Index and Body Condition Score respectively, then definitively scored by body fat percentage via Dual Energy X-ray Absorptiometry. This study seeks to more clearly determine if any association exists between owner and pet weight status, and act as a baseline for more focused studies into the topic in the future.

Amanda Lyles

School of Allied Health Sciences

Faculty Advisor: Bonnie Price

Effectiveness of Dry Needle Acupuncture of Arthritic Canines

Abstract: Osteoarthritis is a progressive disease that is common among the canine population and is characterized as a disease process that causes pain and lameness. The purpose of this prospective cohort study is to determine the effectiveness of improving mobility from dry-needle acupuncture for mild/moderate elbow joint arthritis in canines as an additional treatment to NSAIDs, specifically Metacam and carprofen. The control group will only take either Metacam or carprofen. The treatment group will take Metacam or carprofen and receive dry-needle acupuncture. After the baseline test, both groups will be retested every 2 weeks up until 24 weeks. The treatment group will receive weekly 30-minute dry-needle acupuncture sessions. A pressure plate will be used to determine amount of pressure, in Newtons, that a canine is placing on the affected limb.

In addition, three observers will determine the lameness of the canine and be averaged. Both tests will determine if the canine showed a decline, unchanged, or improvement in condition throughout their participation of the study. Then, the data from both measurements will be analyzed to determine the effect of dry-needle acupuncture compared to NSAIDs alone.

Robin Reed

School of Mathematics and Sciences
Faculty Advisor: Stephen Everly

Chemical Analysis of Cr in Tartary Buckwheat Tea (Fagopyrum tataricum)

Abstract: Tartary Buckwheat Tea (TBT), scientifically named (*Fagopyrum tataricum*), is known to contain traces of six metals (Zn, Cu, Pb, Cr, Ni, and Cd). Chromium, specifically its valence state of Cr (VI), is of special interest due to its carcinogenic properties. The Cr concentration in TBT samples was measured via Atomic Absorption Spectrometry (AAS). No significant traces of Cr were detected in the samples tested.

Stephanie Wright

School of Mathematics and Sciences
Faculty Advisor: Muthu Dharmasena

Assessment of the Virulence of Escherichia coli Samples Collected from the Powell River

Abstract: The Powell River in Harrogate, TN is a popular tourist destination. Human activity on the river is increasing which should increase the level of *Escherichia coli* (*E. coli*) in it. Water samples were collected from the river October to November in 2020 from various sites. Blue color colonies on *E. coli* petri films were obtained as pure cultures on Tryptic Soy Agar and stored under refrigeration. The samples were tested for viability in 0.5 % Tryptic Soy Broth, TSA, and Eosin Methylene Blue. Deoxyribonucleic acid (DNA) was extracted from isolates by boiling at 96° F for 15 minutes. Samples were transferred to ice and centrifuged for 5 minutes at 10,000 rpm. Polymerase Chain Reaction (PCR) was performed on the DNA samples using a process found in a Bangladesh study (Talukdar 2013). Virulence was tested using the STX1 and STX2 genes with a synthetic DNA as a positive control. PCR results will be analyzed by gel electrophoresis. Evidence of virulence should present as bands for STX1 at 661 kbp and STX2 at 372 kbp. This result will indicate the Powell River has potential to be hazardous to humans.

Morgan Simpson

School of Allied Health Sciences
Faculty Advisor: Kathryn Purple

A Trichy Decontamination Situation: Characterizing the Trichomonas gallinae Growth Curve After Disinfectant Exposure

Abstract: *Trichomonas gallinae* is a protozoan parasite affecting avian species, including doves, finches, and raptors. It is transmitted through contaminated bird baths and through birds feeding their young. This parasite can be fatal to many avian species. One way to mitigate trichomonosis is to decontaminate bird baths. We aim to determine the most effective level of disinfectant to decrease parasite levels, while minimizing the negative effects on the birds. We will take a known amount of *T. gallinae* and expose them to various disinfectants. After different incubation times with the disinfectant we will remove the parasites and characterize their growth curve. Our preliminary findings have shown that bleach is the most effective disinfectant for this purpose.

Adamarys Gonzalez Frutos

College of Veterinary Medicine
Faculty Advisor: Heather Bhakta

How Does Western Medicine Compare to Chinese Acupuncture When Treating Hip Dysplasia in Dogs?

Abstract: Currently, some common forms of treatment in the west for Hip Dysplasia in dogs are joint supplements, physical therapy, anti-inflammatory medicine (NAIDS) and in serious cases surgery is also available, such as Femoral Head Ostectomy (FHO) or a Total Hip Replacement (THR). Moreover, there is treatment in China too, a form of traditional medicine that has been used for both humans and animals of various ailments, this treatment being acupuncture. This involves using thin needles that are inserted into specific points in the skin. After a few sessions, pain relief sets, and quality of life improves. This is true for dogs too who are being treated for Hip Dysplasia. Chinese acupuncture has also been tested to be safe and is a non-pharmacologic alternative medicine with minimal adverse effects. To implement it to western practice, an experiment will be conducted to prove its effectiveness for treating Hip Dysplasia in dogs. After six months of study results will be collected from 100 dogs with moderate or severe Hip Dysplasia split in half into two groups, each receiving either western treatment or Chinese acupuncture. The results will illustrate if Chinese acupuncture is effective and better alternative for dogs then western medicine.

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