2023 BKX-NIS ABSTRACTS

BIO1

HOW WATER QUALITY IMPACTS ECOSYSTEM HEALTH IN THE ELIZABETH RIVER

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The Elizabeth River has played a crucial role in US History and aided in the Hampton Roads area's industrialization, which led it to undergo heavy use and left it as one of the most polluted bodies of water in the Chesapeake Bay. The chemical contamination and military entities left branches of the river legally dead with no hope of restoration. With a doubtfully dead river, many marine scientists collaborated to create a solution to improve the overall water quality by measuring, analyzing, and implementing the best environmentally friendly solution. These scientists are known as the Elizabeth River Project, who have worked diligently to restore the original environmental quality of the Elizabeth River. Moreover, the Elizabeth River Project partnered with the Virginia Institute of Marine Science to utilize their System-Wide Monitoring Program (SWMP) device of a solar-powered water quality monitoring station (EXO2), a water quality sonde. During summer 2021, this device was used to collect dissolved oxygen measurements, pH, turbidity, fluorescence, chlorophyll, specific conductance, salinity, temperature (℃), and water depth at 15-minute intervals. These same characteristics were measured in duplicate using a portable water quality tester (EXO1) weekly. Heavy experimentation and analysis showed that the pH and salinity levels were ideal, but the dissolved oxygen levels are below ideal for a restored estuary wetland. This research also accounted for recent precipitation and solar radiation. This data suggests the river must undergo more restoration methods to restore its original health. Furthermore, this information can be used by organizations focused on the river's health to make decisions about future restoration efforts.

BIO2

OBESITY REDUCTION TO PREVENT DIABETES

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The purpose of this study was to show an educational docuseries written and produced by former Fisk University Student Health Ambassadors and alumni as a health intervention targeted at African American college-aged students attending a historically Black institution using Web 2.0 technology, YouTube. Moreover, a central goal of this research was to determine if there was a change in knowledge of the research participants after completing the initiative. Further, another objective of this research was to highlight the relationship between obesity and the instance of comorbidities such as diabetes, high blood pressure, and COVID-19 amongst many others. This is important to note as the recent COVID-19 pandemic has demonstrated that individuals with underlying health conditions have a greater likelihood of experiencing severe illness.

Foremost, 101 freshman students at Fisk University were selected from a freshman only course. Subsequently, a pre-test was administered to all participants via Google Docs. Then, participants watched the 3-part docuseries over approximately 25 minutes. The videos addressed a variety of health and wellness topics including exercise, healthy eating, sleep hygiene, to name a few. Moreover, after watching the docuseries, a post-survey was administered to determine if there was a change in knowledge, attitude, and awareness amongst the students.

There was an approximate 19.2% increase in knowledge when participants were asked, "What food groups should you incorporate into your meals according to ChooseMyPlate.gov?" Further, there was an approximate 10.4% increase in knowledge when participants were asked, "What is sleep hygiene?" Also, there was an approximate 19.2% increase in knowledge when participants were asked, "How many hours of sleep should you get per night?" Moreover, there was an observed 12.8% increase in knowledge when participants were asked, "True or False. Following the serving size on nutrition labels can help with portion control, prevent overeating, and help you save money?"

Overall, the initiative proved to be a valid instrument to educate the target population, a freshman class of HBCU students at Fisk University, on Obesity Reduction to prevent Diabetes. The pre and post surveys functioned as an accurate measurement of initial and subsequent knowledge. After completing the initiative, it is concluded that there was an evident increase of knowledge of obesity.

BIO3

ASSESSING THE PRESENCE OF MICROPLASTICS IN THE ELIZABETH RIVER USING EASTERN OYSTERS (CRASSOSTREA VIRGINICA) AS BIOINDICATORS

Jensyn Carr, Marcus Walker and Ashley Haines. Norfolk State University, Norfolk, VA.

The presence of microplastics in marine habitats is an increasing problem. Numerous studies have confirmed the presence of microplastics in bodies of water all over the world, including the Chesapeake Bay. However, little research has been done on the presence of microplastics in the Elizabeth River, an estuary located on the southern end of the Chesapeake Bay. This study aims to use oysters as a bioindicator to establish the presence, diversity, and relative quantity of microplastics in the Elizabeth River. To accomplish this, oysters were collected from two sites on the river, digested in a 10% KOH solution, and filtered. The results show that there are microplastics in oysters that reside in the Elizabeth River. Microfragments were much more abundant than microfibers found in the samples. Blue microplastics were more commonly found than any other color. These data are comparable to that of other microplastic hotspots around the world. Future goals for this work are to continue collecting oyster samples from the Elizabeth River, use Raman spectroscopy to determine chemical types in the plastics, and use these data to work with the Elizabeth River Project to help limit future inputs.

BIO4

THE RELATIONSHIP BETWEEN LEARNING PREFERENCES, PRESENTATION STYLES, HIGH-IMPACT INSTRUCTIONAL STRATEGIES, MOTIVATION, AND EMOTIONAL INTELLIGENCE ON BROADENING STEM PARTICIPATION

Ellis Jackson, Scott Wicker and Tierra Freeman-Taylor. Kentucky State University, Frankfort, KY

The present study will investigate the correlation between learning preferences, presentation styles, high-impact instructional strategies, undergraduate motivation, and emotional intelligence. An evidence-based measure of effect size will be used to plan an a priori sample size calculation of undergraduate students, especially STEM undergraduate students recruited at Kentucky State University, to participate in the study. Participants will complete four self-report measures: the Learning Style Inventory, the Presentation Style Inventory, the High-Impact Instructional Strategies Inventory, the Motivated Strategies for Learning Questionnaire, and the Emotional Intelligence Scale. The principal investigators anticipate results will show significant correlations between learning preferences and presentation styles, with students who preferred auditory learning more likely to prefer presentations with auditory elements. Similarly, there

will be significant correlations between presentation styles and high-impact instructional strategies, with students who preferred discussions being more likely to benefit from problem-based learning and case studies. Furthermore, emotional intelligence is anticipated to have a positive correlation with STEM undergraduate motivation, indicating that students with higher levels of emotional intelligence are more motivated to learn STEM subjects. The relationship between learning preferences and emotional intelligence was not clearly understood, suggesting that emotional intelligence may not significantly influence learning preferences. Overall, the principal investigators will leverage these potential findings to enhance broadening STEM participation efforts at Kentucky State University by developing interventions such as suggesting that a combination of high-impact instructional strategies, presentation styles, and emotional intelligence is essential for enhancing STEM undergraduate motivation. Educators should consider using high- impact instructional strategies that align with students' learning preferences and presentation styles to improve student motivation in STEM subjects. Developing students' emotional intelligence could also enhance their motivation to learn in STEM fields.

BIO5

DRESS SYNDROME AND SJS/TEN: DIFFERENCES AND SIMILARITIES IN CUTANEOUS ADVERSE DRUG REACTIONS

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Stevens-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) are severe drug hypersensitivity reactions that target mucous membranes and skin. Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) Syndrome is also a rare, potentially fatal hypersensitivity reaction. Although the clinical presentations of these diseases differ, they share many commonalities such as initiating drugs, biomolecular pathways, and certain genetic polymorphisms. A review of the literature was conducted to explore the interrelationship between these hypersensitivity reactions and provide a clear framework for differentiating between them. The complete mechanisms for DRESS, and SJS/TEN are unknown which can make both diagnosis and treatment difficult. DRESS typically presents itself with a maculopapular rash, skin peeling, and multiorgan involvement 2-6 weeks after initiating drug exposure. Treatment includes removal of the offending drug and corticosteroids. SJS/TEN is characterized by an acute onset of fever, skin detachment, and "target-like" lesions within two weeks of drug exposure with treatment including removal of the offending drug. DRESS and SJS/TEN are both T-cell mediated diseases and are believed to share similar biomolecular pathways, those being the hapten/prohapten model, the P-I concept, and the altered peptide model. There is evidence of genetic disposition for these diseases, primarily the HLA-B*15:02. This allele has been strongly associated with developing SJS in combination with treatment with carbamazepine in those of southeast Asian descent. In conclusion, DRESS, and SJS/TEN are severe drug reactions with many overlapping features and further research is needed for improved recognition and management of these conditions.

CH1

CONDUCTIVITY ANALYSIS OF POLY (ETHYLENE OXIDE) CONTAINING BORON CROSS-LINK ELECTROLYTES FOR LITHIUM-AIR BATTERIES

Kymani Williams and Emily Emilien. Fort Valley State University, Fort Valley, GA

This paper discusses research being conducted on polymer electrolytes, with a focus on conductivity under different temperatures. The purpose of this research was to determine the conductivity of polymer-electrolytes under different temperature conditions while determining if it affected the performance of

conductivity. Polyethylene oxide (PEO) and Pure Triglyme-Boron (Pure TB) were the sample groups selected ranging from 4-5 samples, tested at several varying temperature ranges for the different lithium salt blend ratios. PEO was the first polymer electrolyte used in lithium batteries since the 1970s and was used as a benchmark. Polymer electrolytes are extensively used batteries based with a focus in energy storage and energy conversion. Liquid based polymers have been the focus in the past, however organic liquids are flammable, toxic, and have limited electrochemical stability. The research conducted dealt with gel-like, and solid-state PEO and Pure TB samples. Solid-state can contain most of the same problems caused by the liquid-based polymers. The method used was conductivity testing via a lab built electrochemical cell, with a multimeter connected running current through a copper-based electrode with the polymer in between. Data was accumulated via Lab Tracer, the software which set the voltage parameters, and documented voltage and current over 3 trials per temperature. Resistance was computed to solve for conductivity at each temperature for each sample. All data was plotted via excel spreadsheet, and comparative plots were made per each sample group. In conclusion, the data proved that conductivity increases at higher temperatures as salt blends increased as well.

CH2

ANTI-APOPTOTIC PROTEINS BCLXL AND MCL-1 PROMOTE APOPTOTIC RESISTANCE IN GLIOBLASTOMA

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This study investigated the use of BH3 profiling to identify apoptotic blocks in glioblastoma multiforme (GBM) cells, a highly aggressive and apoptotic-resistant brain cancer that responds poorly to treatment. The researchers extracted GBM cells from patient tumors and exposed them to BCL-2 inhibiting peptides to measure cytochrome c levels in the cell, identifying which blocks cell death. BH3 profiling effectively identified a specific dependence on BCLXL and MCL1 apoptotic blocks despite the heterogeneity of GBM cells. The study also examined the use of BH3 mimetics, drugs that mimic pro-apoptotic proteins by binding to BCL-2 proteins' BH3 domains, to target the identified apoptotic blocks and induce an increased apoptotic response. The results showed that a dosage of 1000 nM of BCLXLi and 250 nM of MCL1i produced an optimal apoptotic response, with a synergy score indicating the increased effect of the combined treatment due to drug interactions. The synergy score of BH3 mimetics showed increased effects of combined treatment due to drug interactions. The MCL1 and BCLXL inhibitors had far greater synergy and produced a greater apoptotic effect than other drug combinations.

CMPE1

UTILIZING MATHEMATICAL MODELING TO APPROXIMATE TUMOR GROWTH

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Cancer is one of the leading chronic illnesses plaguing our healthcare system. As the medical field advances in treatment for these patients, Ordinary Differential Equations (ODEs) are commonly utilized to track tumor growth within cancer patients. Being able to successfully track tumor growth would aid in changing the trajectory of future cancer treatment with specific chemotherapy. In prior research although these ODE models were helpful, many equations cannot be solved easily and it is difficult to find the exact solutions. In our preliminary research, we initially utilized both Exponential and Gompertz models in order to create and visualize growth trends incorporating both the hypothetical results and true values.

The Exponential model was often used at predicting early tumor growth, and the Gompertz model was shown to provide the best fits for breast and lung cancer growth. Mathematica software is being used to find the computational results. The Euler's method, which is the basic numerical method, has been used to solve both models. To increase the accuracy of the results, we also use the Heun's method (also called modified Euler's method) to improve our results. Relative errors are calculated in order to depict the overall difference of the approximated values compared to the exact values, and this also works to illustrate validity within our methods. The overall analysis consists in studying and comparing, both analytical and numerical values, the results for each mathematical model and each numerical method will be discussed.

CMPE2

PREVALENCE OF DEPRESSION AMONG PEOPLE OF DIFFERENT SOCIOECONOMIC AND RACIAL/ETHNIC GROUPS

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The prevalence of depression among people of different socioeconomic and racial/ethnic groups has been widely recognized. According to Mayo Clinic, depression is a mood disorder that causes a persistent feeling of sadness and loss of interest, affecting individuals of all genders, ethnicities, races, and walks of life. Despite this, depression presents differently in various identities due to the complex intersections of our society. Specifically, depression in people of color is influenced by a range of factors, including generational, situational, and genetic traumas that cause psychosocial stress, as well as the presence of other diseases. The goals of our research project are to understand the relationship between socioeconomic factors and depression and to identify potential causes or risk factors. We analyzed two datasets to accomplish this task. The first was the 2018 and 2020 National Health Interview Survey by the CDC, which included about 85,000 people of color and allowed us to identify relationships before and during the COVID-19 pandemic. The second dataset we used was the Jackson Heart Study, an extensive 15-year data set of over 5,000 African American people that enabled us to analyze the disparities related to depression among African Americans.

CMPE3

LIBRARY MANAGEMENT SYSTEM DATABASE

Zainab Khan, Huston-Tillotson University, Austin, TX.

The Library Management System (LMS) is a must-have tool for every library that wants to successfully manage its resources. The LMS database oversees storing and maintaining all library data, such as books, users, borrowing history, and other vital information. The database architecture for an LMS is critical to ensure the system's efficiency and involves careful consideration of a variety of elements. One of the most important characteristics of a LMS database is its capacity to hold information on books, such as author, publisher, ISBN, and other pertinent metadata. This data may be used to organize, search, and filter the library's collection to make it easier to access and borrow. The database also keeps track of library patrons' names, addresses, contact information, and borrowing history. This information may be used to track borrowing habits and produce library use reports. Another important element of a LMS database is its capacity to track library resource borrowing and return. This function aids in the timely return of books and offers a means for enforcing penalties on overdue volumes. A database may also be used to handle reservations and hold requests for popular goods. To summarize, a LMS database is an essential

component of library administration, supporting effective resource management and offering useful insights into library usage.

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One of the most important characteristics of an LMS database is its capacity to hold information on books, such as author, publisher, ISBN, and other pertinent metadata. This data may be used to organize, search, and filter the library's collection to make it easier to access and borrow. According to American Library Association research, libraries that use an LMS can save the time necessary for processes like cataloging, circulation, and inventory management by up to 50%. This can result in considerable cost savings for the library as well as greater librarian productivity. The database also keeps track of library patrons' names, addresses, contact information, and borrowing history. This information may be used to track borrowing habits and produce library use reports.

Another important element of an LMS database is its capacity to track library resource borrowing and return. Based on a poll of library professionals done by Library Technology Guides, 85% of respondents reported an improvement in productivity after using an LMS, while 68% claimed a reduction in mistakes.

To summarize, an LMS database is essential to library administration, supporting effective resource management and offering useful insights into library usage.

<div align="center">ES1</div>

COMMUNICATING POLYFLUOROALKYL SUBSTANCES (PFAS) INFORMATION TO THE PUBLIC: STRATEGIES, CHALLENGES, AND BEST PRACTICES

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Polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that have been used in a wide range of industrial and commercial applications for decades. Recent studies have shown that PFAS exposure is associated with adverse health effects, including developmental and reproductive problems, immune system dysfunction, and cancer. However, communicating this complex information to the public in a meaningful, understandable, and actionable way has proven challenging. This review of literature analysis examines the current strategies used to communicate PFAS-related information to the public and identifies best practices for effectively conveying the risks and benefits of PFAS exposure. Literature was accessed using an Elsevier database by searching for related topics such as forever chemicals, polyfluoroalkyl substances, PFAS educational materials, and forever chemical policy impacts. More than fifteen peer-reviewed journal articles were selected for analysis and the development of a communication strategy, including an infographic. The review highlights the importance of providing clear, concise, and accurate information tailored to different audiences' needs and preferences. The review also emphasizes the need for transparency and collaboration between government agencies, industry, and communities affected by PFAS contamination. Effective communication strategies must be based on a shared understanding of the science, risks, and uncertainties associated with PFAS exposure. The review concludes that effective communication of PFAS-related information to the public is essential for promoting informed decision-making, protecting public health, and restoring public trust. A multidisciplinary approach that incorporates the best available science, community engagement, and stakeholder collaboration is necessary to achieve data-informed policy frameworks and reduction goals.

GSO1

USING IRIDIUM OXIDE-COATED NEURAL PROBES TO UNDERSTAND SPACE RADIATION EFFECTS ON THE CNS

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A unique feature of the space radiation environment is the presence of high-energy charged (HZE) particles which may pose a health risk to astronauts. One of the greatest concerns is the possibility of radiation-induced deterioration of central nervous system (CNS) functions. Past research using rodent models has revealed that radiation exposure led to unexpected alterations in behavior where executive functions were compromised which are vital for facilitating the attainment of mission success. This research aims to study CNS-related damage on male and female animal models following radiation exposure using in-vivo electrophysiology. Recently, our experiments at NASA's Space Radiation Laboratory successfully demonstrated wireless neural recordings under HZE environments. However, ground simulation observations may inadequately represent the space radiation, HZE environment. To properly assess neural injuries and cognitive impairments from space radiation and microgravity that astronauts will inevitably face during long-term spaceflight, real-time recordings of behaving mammalian models should be conducted during low earth orbit (LEO) spaceflight. Orbital validation by in-vivo neural sensing will guide investigations for understanding the mechanism behind the occurrence of CNS injuries during long-term, deep-space missions. This research will open new paths for developing shielding and pharmaceutical countermeasures against cosmic radiation effects detected during deep space exploration.

GSO2

AN EVALUATION OF ADDITIVE MANUFACTURING (AM)/3D PRINTING EDUCATION IN ENGINEERING USING CONSTRUCTIVISM LEARNING THEORY AND THE TPACK FRAMEWORK

Ogbonna Ofor, Francesca Mellieon-Williams, Luria YoungFareed Dawan and Albertha Lawson. Southern University and A&M College Baton Rouge, LA.

Additive Manufacturing (AM)/3D Printing is currently positioned to revolutionize how objects are designed and produced. AM's feature of the use of complex geometries to increase design functionality has enabled it to overcome some limitations observed in conventional manufacturing processes, such as the inability to produce complex, hollow structures, and internal channels. Among the major issues in the AM production industry is the lack of skilled AM workforce due to inadequate systematic AM education which is hindering the development of AM workforce. This inadequate systematic AM education is in the form that even though AM courses or topics may be introduced to students, but students are not being adequately exposed to get in-depth knowledge and develop skills in AM. Research in this pilot study employed constructivism learning theory and Technological Pedagogical Content Knowledge (TPACK) framework to evaluate students' AM skill development in a freshman-level engineering course at a Historically Black College and University (HBCU). The research methodology involved an Explanatory Sequential mixed method whereby quantitative data were collected and analyzed first, then qualitative data were collected and analyzed to help explain quantitative data. The instrument used was a previously

validated Engineering Skills Assessment that was developed and tested for validity on engineering undergraduates.

GSO3

INVESTIGATING THE IMPACT OF IMMERSIVE TECHNOLOGY ON COMPUTATIONAL THINKING DEVELOPMENT IN ENGINEERING TRAINING

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Economies are moving towards new models of productivity as a result of digital transformation, interconnectivity, and smart automation. As a result of these technological advancements, existing jobs are changing. Employees are now required to be able to analyze, evaluate, and create ideas for solving complex problems in the real world. Computational Thinking (CT) refers to a set of skills that are necessary to transform real-life problems into computer-solvable problems and apply computer-based solutions to complex problems. Almost all engineering tasks require the use of this set of skills, and many experts agree that CT is a core competency of most engineers. Immersive technology creates a simulated environment or experience that is similar to or entirely different from reality. Immersive technology allows users to interact with three-dimensional (3D) generated environments naturally in a blended virtual and physical environment. In several studies, immersive technology environments have been shown to allow students to practice and develop the ability to think about and manipulate objects in three dimensions (3D). These core cognitive abilities enable the brain to think, read, remember, analyze, evaluate, create, and pay attention. This study utilized a qualitative research approach to examine how immersive technology enhances engineering students' learning experiences and assists them in developing CT skills. Data were collected from 38 engineering students and four faculty through direct classroom observations, focus groups, and face-to-face interviews. The data were analyzed using thematic analysis to identify broad themes. In both interviews and observational data, all participants expressed positive attitudes to the immersive technology experience. According to the findings, immersive technology was an effective and active learning environment for CT skills development.

GSO4

ROLE OF LIPID RAFTS IN REGULATING CANNABINOID RECEPTOR MEDIATED SIGNALING

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The rhodopsin-like family of heptahelical transmembrane-spanning G protein-coupled receptors (GPCRs) include the cannabinoid receptors (CBR1 and CBR2). Several integral membrane GPCRs share structural similarities that enable them to interact with lipid rafts (cholesterol-rich membrane microdomains) which regulate the GPCR-dependent signaling and cellular functions. The CBR1 and CBR2 belong to GPCRs family proteins that are crucial for preserving cellular homeostasis. In regards to the functioning, compartmentalization of CBR1 and CBR2 in membrane domains is poorly understood. Earlier studies from our laboratory provide strong evidence of e-cigarettes vapor condensate (TF-ECVC) mediated inflammation in lung epithelial cells. We postulate that the regulation of CBR-mediated signaling in lung epithelial cells exposed TF-ECVC is mediated by membrane microdomains/lipid rafts. Our preliminary

results demonstrate-ECVC mediated: 1) increase in CB1 and CB2 expression; 2) redox imbalance; 3) increase in transcription of MAPKs and lipid rafts associated proteins; 4) induced expression of β-arrestins; and 5) increase in the inflammatory mediators-in A549 cells. Interestingly, we observed that the localization of CBR1 and CBR2 was found in lipid raft fractions of TF-ECVC challenged alveolar epithelial cells. Furthermore, using in silico approach we provide evidence of a strong interaction between CBR1 with nicotine-bound Caveolin-1 (-464 KJ/mol) compared to unbound caveolin-1 (-385 KJ/mol). Overall, our findings unveil that the membrane microdomains play a role in the initiation and organization of CBR- signaling. Further studies are in progress to identify the detailed molecular mechanisms.

GSO5

MELATONIN RESCUES CIGARETTE SMOKE EXTRACT-INDUCED INFLAMMATION AND AUTOPHAGY IN LUNG EPITHELIAL CELLS

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Cigarette smoking and other nicotine-based products cause chronic lung inflammation. Despite improved therapeutic options, the prognosis of cigarette smoke (CS) induced inflammation and associated pathologies has not changed significantly. Diet supplementation strategies are alluring in this regard because the implementation is relatively simple in populations with limited income and resources. Though N-acetyl-5-methoxy-tryptamine (melatonin) is produced by the pineal gland and other human tissues, its role as a dietary supplement (Phyto melatonin) is being extensively studied in various inflammatory models. Literature review suggests that oxidative stress and autophagy is induced by wide variety of stimulants which cause protein degradation, DNA damage, and/or cell death; thereby resulting in dysregulated homeostatic conditions. There is a growing interest to study the involvement of Danger Associated Molecular patterns (DAMPs) in regulating the oxidative stress and autophagy process in various pathological conditions. In light of these facts, we hypothesized that supplementation of melatonin can rescue CS-induced inflammation. We used human type II alveolar epithelial cells (A549) and treated them with melatonin (0.25 µM) for 1 hour prior to Cigarette Smoke Extract (CSE; 250 ng/ml; 24h)-challenge. Our results showed increased production of cytokines/chemokines (IL-6, IL-8, CCL2 and CCL5); the expression of DAMPs (HMGB1 and Hsp70); inflammatory mediators (NF-kB, STAT3 and p38 MAPK); autophagy-related proteins (Beclin1 and LC3B); NADPH oxidase subunits (p22phox, p47 phox, p67 phox and gp91 phox); and antioxidants (MnSOD, Catalase & GPx)-in CSE-challenged A549 cells. Interestingly, pretreatment with melatonin was able to rescue several of the studied inflammatory mediators following CSE-exposure in A549 cells. Further studies are in progress to delineate the molecular mechanisms in detail.

GSO6

RNA EXPRESSION OF PSEUDOMONAS AERUGINOSA STRAIN PA14 UNDER TRADITIONAL ANTIMICROBIAL SUSCEPTIBILITY TESTING AND PHYSIOLOGICALLY RELEVANT CONDITIONS

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Pseudomonas aeruginosa is a ubiquitous, gram-negative bacterium that is rarely problematic for healthy individuals, but is critically challenging to immunocompromised hosts. P. aeruginosa can cause difficult-to-treat nosocomial infections, with increased mortality risks, such as burn infections, Possible Ventilator-Associated Pneumonia (PVAP), and chronic infections in cystic fibrosis patients [1]. In recent years, drug discovery for P. aeruginosa has become a high priority due to the increased prevalence of multi-drug resistant (MDR) strains [2]. Antimicrobial peptides (AMPs) are attractive therapeutic candidates for MDR bacteria. AMPs are easily synthesized, have demonstrated potency, and are less likely to stimulate resistance [3]. However, the suitability of traditional antimicrobial susceptibility testing (AST) methods for AMPs has been recently questioned, as the AST media Mueller-Hinton broth may inhibit AMP function [4]. Additionally, drug discovery efforts could be complicated if a novel therapeutic is significantly more effective under AST conditions than under cell culture conditions, which are more representative of human infection. In the present study, we hypothesize that P. aeruginosa strain PA14's transcriptome under AST conditions will show higher antimicrobial susceptibility than its transcriptome under cell-culture conditions. We grew P. aeruginosa strain PA14 in three different media: nutrient broth as a control, Mueller-Hinton broth as AST media, and Dulbecco's Modified Eagle's Medium (DMEM) as cell-culture media. We then extracted and analyzed the RNA to identify any changes in antimicrobial susceptibility under AST and DMEM. Results show that the expression of genes (mexG, opmD, mexH, mexI, amrB, opmE, oprM, crcB, and mexR) known to contribute to antibiotic resistance increased under cell culture conditions when compared to AST conditions. These findings support a need to perform AST in more physiologically relevant media to identify the most potent antimicrobials for pre-clinical studies.

<div align="center">GSO7</div>

UNDERSTANDING SCIENCE TEACHERS CULTURALLY RELEVANT TEACHING PRACTICES

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This study examines the importance of educators' ability to teach using culturally relevant practices; it is paramount that we understand culturally relevant pedagogy and how it has evolved from a theoretical framework that links teaching practices and students' culture to providing equity and successful learning outcomes within the classroom. Culturally relevant pedagogy (CRP) is a theoretical framework synthesized by Gloria Ladson-Billings to describe teachers' teaching practices that build upon students' cultural knowledge. In her model of culturally relevant pedagogy, Ladson-Billings list three components: a) students must experience academic success, b) develop and maintain their cultural competence, and c) develop a critical conscience through which they change the current status quo of the social order. Studies have shown through CRP practices, teachers can help raise their student's critical consciousness in addressing social issues, promoting academic success, building ecosystems that support the growth of all, and helping them recognize the value of others' cultures. Through culture, teachers can empower students to succeed academically and become change agents in their communities. In science education, instruction built upon the tenets of CRP can allow all students to engage in scientific learning, bringing in the existing knowledge and building upon it through experiential learning with others. Studies have indicated the benefits of culturally relevant teaching practices for students of color. Little research has been done on what these actions look like and teachers' ability to do these actions in a secondary science classroom.

This case study describes teachers' self-efficacy using the tenants of culturally relevant teaching practices science. The participants are eight secondary science teachers who participate in a ten-month (sessions were held monthly) professional learning community that focuses on implementing virtual reality in their

environmental science instructional practices. This study examined the culturally relevant practices of these science teachers' instructional practices of culturally relevant practices (pedagogy) by using guiding questions describing the teachers' beliefs about their self-efficacy in CRT and instructional practices. It further questioned the role of action research and the professional learning community in their ability to implement CRT in their science instructional practices. The participatory researcher collected data from the eight teachers participating in the program in the form of interviews and observations by focusing on the three tenants of the Ladson-Billings framework. The researcher gathered data from the teachers' lesson plans, student work, and observations of teachers' dispositions. The findings from this research indicate the need for professional learning communities to help teachers increase their ability to implement CRP within their instructional practices. Action research indeed increased the teacher's reflective practices, which allowed them to learn more about their teaching practices and gain a better understanding of CRT.

GSO8 (NC)

AN ANALYSIS OF VIRTUAL REALITY USAGE AMONG STUDENTS IN STEM FIELDS (AGRICULTURAL SCIENCES AND ENGINEERING)

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Universities have had to adapt quickly to changing circumstances to ensure that students have access to the tools and resources they need for their academic success. By leveraging VR technology, universities can create a virtual learning environment. This allows students to have the same access to resources, instruction, and collaboration as they would on a physical campus. This not only enables students to continue their learning even during an emergency but also allows them to access a more diverse range of resources and learning experiences than would be possible in a physical classroom setting (Huang et al., 2021). By using this technology, such as ThingLink, Veative, and Cave automatic virtual reality, students can explore, interact, and gain an understanding of the subject matter that is both meaningful and memorable. With the help of this technology, students can use their creativity to engage in the material, developing a deeper understanding of the subject matter in a way that is both productive and impactful. To better understand the potential of VR in the instructional process, a study should be conducted to assess students' attitudes towards VR technology in the instruction of agricultural sciences at a public HBCU in the southeastern United States (Vickrey et al., 2018). With its immersive and interactive approach, VR provides an engaging and impactful learning experience in colleges and universities that helps students develop practical skills and gives them the confidence to apply their knowledge in real-world settings. To further explore the potential of employing virtual reality in teaching STEM and agricultural science, research should focus on students' silent beliefs and intentions to use it. To fully understand the effectiveness of the implementation, it is critical to evaluate the various factors that may affect its success. Qualitative and quantitative research results will be analyzed to gain insight into the implementation's effectiveness, taking into account any potential influencing factors. The data gathered from this research will provide insight into how VR can be used effectively to expand educational opportunities in these fields and foster collaboration between students, instructors, and educational institutions worldwide.

GSP1

BREAST CANCER: RAISE AWARENESS AND LOWER RISK

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Breast cancer is a disease that causes breast cells to grow out of control which can lead to several health issues. To continue, breast cancer can manifest in the lobules, ducts, and connective tissue of the breast and the rates of this disease vary by race and ethnicity. However, for African American women, breast cancer is the most common form of cancer. Throughout the recent coronavirus pandemic, it has been shown that people being treated for breast cancer may have a higher risk of severe illness if they contract COVID-19.

Over 100 African American women were recruited to participate in an informational event in partnership with Rutherford County Health Department, Ascension St. Thomas Hospital Midtown, and Matthew Walker Comprehensive Health Center where members of their team educated participants on ways to increase awareness and lower risk of breast cancer. Also, the incorporation of how COVID-19 has impacted breast cancer was added. The event was promoted through a series of social media posts via Instagram, email, and word of mouth. The data was collected through a pre-test and post-test to determine the knowledge gained from the event.

This informational presentation was able to raise awareness about the different types of breast cancer, increase knowledge on ways to decrease chances of developing breast cancer, and expanded familiarity with resources that provide breast cancer screenings in the Nashville area at a reduced or no cost to African American women. There was a 30% increase in knowledge between the pre- and post-surveys regarding the appropriate age a woman should start getting annual mammograms and a 24% increase of knowledge regarding ways women can reduce their risk of developing breast cancer.

Breast cancer is a health disparity that disproportionately affects African American women. It has been found that African American women tend to be diagnosed with the most aggressive forms of breast cancer. A contributing factor to this health disparity is this demographic's lack of education and resources. This study focused on providing information to African American women in the Nashville community through a health professional about breast cancer and ways to raise awareness and lower risk. The data gained indicated increased knowledge from participants when comparing the pre and post-surveys. Efforts to achieve breast health equity can occur with access to high-quality screenings and care. By creating a virtual event for African American women, focused on breast cancer, knowledge, attitudes, and behaviors can significantly increase as this demographic is often overlooked. By the same token, spreading awareness regarding the disease, sharing ways to lower risk, and encouraging participants to complete annual breast cancer screenings can have a large impact in lowering breast cancer instances among this population.

GSP2

THE IMPACT OF COMPUTER BASED TECHNOLOGIES ON BUSINESS COMMUNICATIONS

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The importance of using Information Communication Technology (ICT) such as enterprise resource planning (ERP) and electronic commerce (e-commerce) by business firms cannot be overstated. ICT applications have been the major interest of researchers and practitioners due to the benefits that can be generated from these applications. The purposes of this study are to find the impact of ICT technologies and application on business firms. An intensive literature review has been conducted to identify the trends and patterns of academic researches. Suggestions based on the review have been made. There are gaps in

the literature pertaining to the role of e-commerce and ERP. More studies are needed to fill the gaps. The findings show that most of the studies have focused on adoption factors, benefits, and barriers of e-commerce rather than using e-commerce in area such as productivity and cost. The relationship between ERP and productivity was found to be significant.

GSP3

ROLE OF CARBON NANOTUBES IN DPE-INDUCED INFLAMMATION

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Engineered nanoparticles, including single- or multi-walled carbon nanotubes (SWCNTs/MWCNTs) have extensive use in industrial and consumer products. The SWCNTs/MWCNTs-pose severe human health risks upon inhalation. The carbon nanotubes (CNTs) by design have an extremely high surface area and avidly bind to pollutants or biomolecules and can modify the inflammatory responses of immune/non-immune cells that interact with them. The condition becomes complicated with the 'functionalization' of CNTs by the addition of chemical groups (e.g., carboxyl or amine groups) that modify their unique physicochemical properties. Though CNTs are regarded as promising materials for cleaning up the environment, recent studies show severe exacerbation of allergen/smoking/diesel exhaust-induced lung inflammation and/or fibrosis by CNTs with molecular mechanisms not being clear. In this regard, we observed diesel particulate extract (DPE)-mediated increase in cytokine/chemokine production; expression of NF-κB; and autophagy/apoptotic pathway proteins in A549 cells. In order to understand the impact of CNTs on DPE-induced inflammation, we conducted in silico studies. In brief, ligands and proteins were prepared by optimizing their geometry, adding hydrogen atoms, and assigning partial charges. The molecular docking of TLR4- surface receptor was performed with 34 DPE components using Samson 2022 R2. The highest binding affinities were observed for Dibenzo[a,c]anthracene, Benzo[ghi]perylene, coronene, coronene-D12, and dibenzo[b,k]fluoranthene. We also conducted molecular docking studies by coupling TLR4 with SWCNTs in the presence and absence of DPE components. Our findings show a significant increase in the binding affinity of SWCNTs with TLR4 in presence of DPE components. Overall, our in silico results provide evidence about the possibility of inflated DPE-induced TLR4-dependent immune/inflammatory response by CNTs. Further studies are in progress to demonstrate the surface and intracellular accumulation of CNTs, and their role in regulating DPE-dependent inflammatory responses in lung epithelial cells.

GSP4

UBC4/5-MEDIATE E6AP-DEPENDENT DEGRADATION OF DAMAGED PROTEINS IN E-CIGS VAPOR CONDENSATE-CHALLENGED LUNG EPITHELIAL CELLS

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Electronic cigarettes (e-cigs) are battery-powered devices that heat a liquid into aerosol inhaled/exhaled by the user. Long-term use of e-cigs has been shown to contribute to the development of several pulmonary diseases resulting from dysregulation of proteostasis. The ubiquitin-proteasome system (UPS)

has been shown to play a vital role in eliminating cellular damage and malfunctioning proteins. Ubiquitin is added to the target proteins through the action of ubiquitin-activating enzymes (E1), ubiquitin-conjugating enzymes (E2), and ubiquitin ligases (E3). The findings from our laboratory demonstrate the important role of inducible catalytic subunits of 20S proteasome (immunoproteasome) in E-cigs vapor condensate (ECVC) induced inflammation/cellular homeostasis in lung epithelial cells with type-II characteristics (A549). We also observed a significant increase in E2 enzymes (UBC4 and UBC5) in our study model. Based on our findings we hypothesized the possible role of UBC4/5 in mediating E6AP (E3 ligase)-dependent ubiquitination to degrade the damaged proteins in ECVC-challenged cells. Using A549 cells challenged with (1%) TF-ECVC±N (6 mg/ml; 24h) we observed a significant increase in the expression of E6AP. Additional studies also demonstrated ECVC-mediated increase in deubiquitinase (DUB) family proteins classified as ubiquitin-specific proteases (USPs)- USP-7,14, CYLD; and ubiquitin carboxyl-terminal hydrolase (UCHL-5). Studies also revealed ECVC-mediated regulation of 19S cap subunits Rpn-1, -10, -11, and -13, where Rpn10 is associated with the degradation of proteins with single chains of K48-linked ubiquitin. In this regard, Rpn13 has been shown to retard the degradation of various single-chain substrates in earlier studies. Importantly, proteins with multiple short ubiquitin chains can be targeted more efficiently for degradation by proteasomes through the ubiquitin-like domain, when bound by Rpn13. The deubiquitylating enzyme-UCHL-5, on the contrary, debranches 'Lys-48'-linked polyubiquitin chains promote degradation. Overall, our findings provide critical information about the role and regulation of UPS components in ECVC-challenged A549 cells.

GSP5

POSSIBLE ROLE OF RPS6 IN REGULATING SUMO-DEPENDENT INTRINSIC APOPTOTIC PATHWAY IN DPE-CHALLENGED LUNG EPITHELIAL CELLS

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There is an increase in threat to our environment due to the extensive use of diesel engine motors especially in non-road types of equipment. Diesel particulate extract (DPE) is a mixture of particulate matter, organic, and inorganic solvents produced during the combustion process of diesel engines being used in the agriculture, mining, and industrial sectors. Occupational exposure to DPE also results in immune modulation and various pulmonary pathologies. However, the molecular mechanisms associated with DPE-induced toxicity/inflammation are far from clear. Using DPE-challenged (25 µg/ml; 48h) human lung epithelial cells with type II characteristics (A549) we observed a significant increase in the transcription/translation of small ribosomal protein RPS6; pro-apoptotic markers (BAX, BAK, BAD, CASP9, and CASP3); SUMOylating (SUMO1; SUMO2/3) and deSUMOylating components (SENP5; SENP7). Interestingly, DPE challenge reduced transcription of autophagy genes (Beclin1, AGT12, ATG16), SUMOylating component (SUMO1), and deSUMOylating component (SENP3) in A549 cells. Earlier studies suggest that RPS6, in its unphosphorylated form, is a selective mediator of apoptosis. We, therefore, hypothesized an important role of RPS6 in regulating SUMO-dependent TRAIL-mediated apoptosis. Interestingly, neutralization of RPS6 rescued DPE-induced expression of SUMO2, SENP5, SENP7; and apoptotic markers (BAX, BAD, BAK, CASP9, and CASP3) in A549 cells. The findings from in vitro studies corroborate our computational modeling results and also fall in line with previous studies demonstrating the positive regulatory role of SUMO2/3 in apoptosis. Additionally, RPS6-neutralization rescued the autophagy process in 48h DPE-challenged A549 cells thereby promoting the homeostatic conditions in the stressed cells. Our findings provide interesting evidence about the role of

RPS6 in cellular processes which regulate cell survival/death during DPE exposure. Detailed in vitro/in silico studies are in progress to further elucidate the molecular mechanisms.

GSP6

NUTRACEUTICAL APPROACH TO MITIGATE PENTACHLOROPHENOL INDUCED RESPONSES: IN VITRO STUDY

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Melatonin, a hormone primarily secreted by the pineal gland plays important role in the circadian cycle. Its role has also been implicated in regulating immune responses and prevention of oxidative damage. Studies have shown that melatonin can rescue epigenetic changes caused during exposure to environmental pollutants. Pentachlorophenol (PCP) is one such highly toxic environmental pollutant that was widely used as a pesticide, herbicide, and fungicide. Although the use of PCP has been restricted in the US due to its carcinogenicity, its use is still prevalent in other countries. Earlier studies demonstrate that PCP exposure induces inflammatory responses and disrupts proteostasis in various study models. In this regard, our results showed an increase in the expression of heat shock proteins-(HSP)40, HSP70, and HSP90 which play important role in protein folding and degradation in PCP-challenged lung and liver epithelial cells. Further, we also observed altered expression of catalytic inducible proteasome subunits (LMP2 and MECL-1) and increased production of cytokines/chemokines in PCP-challenged cells. It has been reported that proteasome regulates the turnover of histone proteins thereby impacting the epigenetic signatures. In this regard, we observed that PCP exposure resulted in altered-global and specific DNA methylation signatures; expression of histone 3 and histone 4; and modified histone signatures (active and/or repressive) in the lung (A549) and liver (HepG2) epithelial cells. Our results demonstrate a possible crosstalk between proteasome function and epigenetic changes in PCP-challenged lung and liver epithelial cells. Based on our findings and earlier reports, we hypothesize that preexposure to melatonin can rescue the altered epigenetic signatures and inflammatory responses in PCP-challenged A549 and HepG2 cells. Further studies are in progress to delineate the molecular mechanisms in detail.

GSP7

PCP AND TCHQ DIFFERENTIALLY REGULATE CELL DEATH/SURVIVAL PATHWAYS

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Consistent accumulation of immunotoxic substances in our environment is of major concern worldwide as it leads to cancer or cause damage to the immune system. Pentachlorophenol (PCP) is one such substance that was used as a pesticide and wood preservative in the US. PCP-mediated genotoxicity has also been linked to one of its by product-Tetrachlorohydroquinone (TCHQ). Our earlier report provides evidence

about PCP-induced inflammation in lung and liver epithelial cells. We observed significant release of cytokines/chemokines and danger associated molecular patterns (DAMPs)-Hsp70 and HMGB1 by PCP-challenged cells. However, not much information is available about the impact of TCHQ in regulating inflammatory responses. Hence, we hypothesized that TCHQ exposure may induce inflammatory responses comparable to PCP, in lung and/or liver epithelial cells. Using human lung epithelial cells with type II characteristics (A549 cells) and liver epithelial cells (HepG2) we elucidated the impact of PCP and TCHQ on the key inflammatory/autophagy/apoptotic mediators. We observed that the mRNA expression of CCL2 and IL-8 was of higher magnitude in TCHQ-challenged cells, while the transcription of NF-κB, STAT3, and TLR4 was observed to be of higher magnitude in the PCP-exposed cells. Additionally, the transcriptional induction of Hsp70 and the apoptotic mediators (Caspase-1, Caspase-3, FAS and FADD) was higher in TCHQ-challenged lung epithelial cells. We also studied the comparative effect of PCP and TCHQ (10 µM) on autophagy-related genes-Beclin-1 and LC3B in HepG2 cells and observed a greater increase in transcription in the former study group. Further studies are in progress to delineate the molecular mechanisms in detail.

PSUG1

BIOCOMPATIBLE POLYGLYCIDOL-BASED HYDROGELS FOR LOAD-BEARING TISSUE ENGINEERING

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We present a degradable polyglycidol-based hydrogel system using oxime click chemistry by employing a ketone-functionalized and an amino-oxy functionalized branched polyglycidol. The orthogonal nature of this crosslinking reaction makes these hydrogels an attractive option for the load-bearing tissue engineering. Our hydrogel synthesis methodology allows for control over the properties of the resulting polymeric network, based upon the ratio between the keto and the amino-oxy functionalities. The potential of these polyether-based networks to serve as a successful delivery platform was assessed by studying their swelling and degradation profiles. Biocompatibility and cytotoxicity of the gels were studied using NIH 3T3 cells. Our preliminary results highlighting the potential of our hydrogels platform will be discussed.

PSUG2

INVESTIGATION OF A PHOTOVOLTAIC CELL BASED ON NON-UNIFORM ILLUMINATION

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Solar cells are the building units of solar panels that convert sunlight into electricity. Most researchers in the field focus on how to refine/improve the standard solar cells to generate more efficient electricity under standard and uniform illumination. Most of these research projects have led to the formation of various photovoltaic cells. For this project, non-uniform light illuminations are investigated for potential new types of photovoltaic cells. For example, p-type photo doped P3HT thin films are fabricated through the process of room temperature pressure solution processing and spin-coating. The cells have one side being covered by a light blocker, while the other sides are left exposed under the light illumination. Light will only shine on the exposed sides. Our preliminary study shows photo voltages are indeed generated as a result of the non-uniform illumination under one Sun power in cells of p-type doped P3HT:PCBM on ITO glass slides. Detailed mechanisms are being evaluated, and further studies are underway.

PSUG3

POST-POLYMERIZATION MODIFICATION OF BRANCHED POLYGLYCIDOL

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The post-polymerization modification of polyglycidol is of great interest for the synthesis of novel polymeric biomaterials. We present the synthesis of novel ratio-controlled amino-oxy and keto functionalized branched polyglycidols. The biocompatibility and chemospecificity of the amino-oxy functional group make it particularly well suited for applications in bioconjugation, drug delivery and tissue engineering. Amino-oxy functionalized branched polyglycidol can serve as a critical building block for the synthesis of innovative biocompatible and degradable hydrogels that are injectable. Ratio-controlled amino-oxy functionalized species were obtained by controlling the ratio of N-hydroxy phthalimide to the hydroxyl groups attached to the polyether backbone. A similar strategy was utilized to obtained ratio-controlled keto functionalized branched polyglycidols. This unique feature will allow for the tailoring of this branched PEG-like structural motif for the synthesis of novel biomaterials with tailored biochemical and biomechanical properties.

PSUG4

INHIBITION OF ACETYL-COA CARBOXYLASE 1 SUPPRESSES CHOLANGIOCARCINOMA TUMORIGENESIS

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Cholangiocarcinoma, or bile duct cancer, derives from the narrow tubes (bile ducts) that convey the digestive fluid bile. Although it is rare, cholangiocarcinoma is very deadly and treatment options are very limited. New and effective therapies are desperately needed for this deadly malignancy. Acetyl-coenzyme A carboxylase 1 (ACC1) plays many significant roles in biochemical pathways. The biotin-dependent enzyme acetyl-CoA carboxylase (ACC) catalyzes the irreversible carboxylation of acetyl-CoA to create malonyl-CoA, which is the first step for de novo lipogenesis. Our data demonstrate that ACC1 is highly expressed in cholangiocarcinoma tumor tissues compared to the adjacent normal tissues, and highly expressed ACC1 is correlated with poor survival, suggesting that highly expressed ACC1 may promote cholangiocarcinoma tumorigenesis. To approve this hypothesis, we established ACC1 stable knockdown cholangiocarcinoma cells, and ACC1 knockdown suppressed cell growth, migration, and invasion. We have performed Western blot analysis to determine the effect of ACC1 knockdown on several important oncogenic pathways for cholangiocarcinoma tumorigenesis.

PSUG5

AN ANALYSIS OF CANNABINOIDS AND AMMONIUM NITRATE AQUATIC POLLUTION ON THE MORPHOLOGICAL DEVELOPMENT ON PRE-METAMORPHIC TADPOLES

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The declining population of amphibians is caused by pollution in their habitats caused by agricultural and pharmaceutical runoff containing harmful chemicals from fertilizers. Ammonium nitrate is an endocrine disrupting chemical found in fertilizers, herbicides, and insecticides that enters waterways from agricultural and pharmaceutical runoff and ground water pollution. The Environmental Protection Agency

regulates the amount of endocrine-disrupting chemicals present in drinking water and 10mg/L is the safe amount of ammonium nitrate that is present in drinking water. The recent legalization and medicinal usage of cannabinoids across the nation has raised the demand for cannabinoids derived from hemp and cannabis. Growing cannabis and hemp plants requires a significant amount of water and causes pollution due to agricultural runoff. Cannabinoids are the compounds found in hemp and do not completely metabolize in the body making them present in human waste and are classified as a pharmaceutical pollutant. Waste from cannabinoids is found in the water system which potentially exposes aquatic life to these substances. In this study, the morphological and developmental effects of the cannabinoid CBD and ammonium nitrate were analyzed in Lithobates pipiens. The hormone thyroxine determines the growth rate and initiates metamorphosis that begins in the skin. The Gosner stage developmental chart was used to identify and determine the growth rate and development of pre-metamorphic tadpoles. In this study ten tadpoles were placed in four, 26L tanks with treated drinking water and filters. Pollutants containing 10mg/L ammonium nitrate, 0.6mg /LCBD, and 2.7mg/L of CBD, respectfully, were added to the tanks. The tanks were observed and evaluated for the effects of the bioaccumulation The tanks were tested for pH, nitrate levels and development of tadpoles . Histological analysis performed on the skin and liver demonstrated that the hepatic cells of the polluted tadpoles exhibited damage and few nuclei were visible leading to necrosis. Tadpoles exposed to 0.6mg/L CBD exhibited the same damage to the hepatic cells. A microbial and histological analysis of the tadpole skin exposed to the mandated EPA of ammonium nitrate exhibited peptidoglycan layer of the cell was destroyed and histological the skin was characterized by having zoosporangia between chromatophores and dermis layers. The morphology of the skin observed on the tadpole contained a fungal infection that would cause zoosporangia. The study determined that 10mg/L of ammonium nitrate and 2.7mg/L CBD toxicity yields 80% mortality rate and 0.6mg/L CBD, 30% mortality rate. CBD in normal dosages and is not a pharmaceutical endocrine disrupting chemical and tadpoles to grew normally. In this analysis cannabinoid affected the morphology and physiology of the tadpole. A hepatic analysis showed the physiological effect that both cannabinoids and ammonium nitrate deteriorated the hepatocytes in the liver, leaving very few visible nuclei. This study determines ammonium nitrate is an endocrine disrupting chemical, but CBD is not endocrine disrupting in low amounts, allowing tadpoles to develop into healthy frogs.

CBD has potential to be detrimental the aquatic life without environmental protection regulation to protect water systems and aquatic life.

PSUG6

STUDIES ON FOLLICULOGENESIS IN THE DOMESTIC CAT

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Folliculogenesis is the cycle of maturation of a follicle within the ovary of the adult human female. A follicle is a membranous sac of cells that contains an immature egg cell, called an oocyte. The primary purpose of this research includes a descriptive study observing different stages of follicle development in the estrous cycle of domestic cat felis catus. This understanding will help enhance our ability to assess risk and develop preventative strategies of ovarian dysfunction. Ovaries from adult female domestic were obtained from routine spaying procedures conducted at the local veterinary clinic. The primary methods utilized in the study included Histology of the ovarian tissue. Briefly ovaries were washed and cut into two halves in 60x15 petri dishes. Ovarian pieces were fixed in Bouin solution for 24 hours. This was followed by rinsing in graded series of ethanol. The tissues were then embedded in paraffin, serially

sectioned (5μm), and mounted onto microscope slides, stained with haematoxylin and eosin by a standard histological. Follicular morphology was then evaluated for various developmental stages of the ovarian follicles.

PSUG7

EPISTASIS OF CYTOCHROME P450 ENZYMES 2C9 AND 2C19

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CYP2C9 and CYP2C19 are crucial proteins that help metabolize drugs via the liver pathway. Despite having a myriad of distinct substrate specificities, CYP2C9 and CYP2C19 only differ in 43 out of 490 amino acids. Interpretation of these differences offers insight on how these particular proteins could affect common drug dosages in the near future. Analysis of stability creating single, double, triple, and a quadruple mutation into CYP2C9 template DNA using wildtype amino acids from the CYP2C19 sequence. Such mutations were then analyzed using flow cytometry to assess the stability of each variant. Results comparing a destabilized variant, a V288E single mutation, an E241K and V288E double mutation, and a wildtype variant revealed the presence of a double mutation at sites 241 and 288, repaired some loss of stability compared to the destabilized and single variants. This observation suggests convergent evolution of the CYP2C9 and CYP2C19 enzyme proteins.

PSUG8

DUF2419 AND THE DYNAMIC QUEUOSINE (Q) CHANGES OF TRNA IN VIVO

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There are over 500,000 proteins that do not have a function in vivo. This makes it harder to understand the development of micronutrients. Micronutrients have a wide range of functions in the brain and body, from the workings of the nervous system to immune function and bone strength. We are always making new discoveries in these areas. It is thought that DUF2419 is involved in actively removing Queuosine (Q) from tRNA in vivo. To better understand micronutrients, Q is a naturally occurring 7-deaza analog of guanosine found at the first position of the anticodon. Q is of increasing interest given that eukaryotes do not have a biosynthetic pathway for Q and all the Q used in eukaryotes comes from either bacteria or indirectly from what we eat. Recent studies have shown levels of certain amino acids affect the levels of Q in tRNA dynamically. When cells are grown in "low" tyrosine media, Q levels in tRNA goes up to nearly 100%. Conversely when cells are grown in "high" tyrosine Q in tRNA goes down to ~15%. We hypothesize that the reduction is due to an enzyme, DUF2419, actively removing Q from tRNA to reset the system and Q levels. Using Trypanosoma brucei RNA to use RNAi to down regulate the gene expression for DUF2419. Then using northern blotting to determine if DUF2419 is responsible for removing Q. We concluded that DUF2419 showed no change in Q levels and in the future we plan to check if the RNAi worked by PCR.

PSUG9

THE EFFECTS OF COAL TAR CREOSOTE ON THE EARLY DEVELOPMENTAL STAGES OF LOCAL GERMINATING PLANT LIFE

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The history that the Elizabeth River has with the industrial trade has taken a hard toll on the health of the river. The high demand of coal tar creosote needed to preserve railroad ties, cords and wood, has caused pollution in the river through run offs, direct exposure, and chemical spills. Coal Tar Creosote is an oily substance that has sunken and settled into the sediment of the river floor. The creosote is made mostly of Polycyclic Aromatic Hydrocarbons (PAHs) which is a known carcinogen. This chemical compound has caused cancers in many of the marine life that inhabit these toxic waters. According to the Environmental Protective Agency (EPA), 0.2 ppb is the maximum contamination level (MCL) for PAH in drinking water. The river has over four hundred times the toxicity threshold, causing restorative methods to be put into action. The river's shore has been compromised. The grass life on the shores of the river have been depleted in the efforts to remove the contaminated sediment. This degradation of the river's shoreline has raised concern about the affects PAH toxicity can have on germinating seeds. Different species of plants are under evaluation to aid in restorative efforts. The hypothesis of this study will demonstrate that as the creosote concentration level increases, the germination count will decrease. This study tested the amount of seeds that germinate in different creosote concentration levels. The analysis was done by observing the exposure of a radical (primary root). Two different species were exposed to five different concentration levels of creosote. This study found that the higher the level of creosote in the soil, the lower the visible mass and germination rate of little blue stem seeds. The PAHs have a negative effect on the visible mass of the switch grass seedlings, the germination count was not affected. The study demonstrates the germination rate of local plants in toxic conditions and determine the need for restorative measures.

PSUG10

QUALITY CARE ASSESSMENT FOR SICKLE CELL PATIENTS

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Sickle cell disease is a chronic, complex illness that affects around one hundred thousand Americans, and exists with no cure for the disease. In Virginia, more specifically the Hampton Roads community, no comprehensive sickle cell program exists. A tremendous need to solve the issues that occur as the result of transition from pediatric to adult care is ever present. Additionally, it exists a necessity for an increase in the communication and availability of local resources as a whole while someone is navigating their sickle cell journey. In an attempt to improve the sickle cell network of Eastern Virginia Medical School, Children's Hospital of the King's Daughter's, and Sentara, an Eastern Virginia Medical School Summer Scholars team conducted 10 qualitative key informant interviews. The research used qualitative exploratory research to determine patient and provider needs. Patients and providers were selected using purposive sampling to participate in semi-structured interviews, which were conducted electronically using Zoom technology, and then transcribed and analyzed. Through analysis, it was a common theme between physicians, that alternative methods to treating a patient with opioids in a sickle cell crisis are available. However, patients and physicians alike equally stated that an improvement in the communication of alternatives to opioids need to be utilized more widespread. Additionally, a strong need for an increase in the local resources for sickle cell patients was reported. It was also conveyed that a lesser focus on sickle cell is present in relation to other diseases such as cancer. While physicians work to treat patients most effectively, physicians reported difficulty identifying patient pain levels. They also reported barriers aligning treatment with insurance regulations. Therefore, a need exists for a comprehensive sickle cell program and patient/family navigation.

PSUG11

PRODUCTION OF HYDROGEN PEROXIDE IN C. ELEGANS FROM PFOS EXPOSURE

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Introduced in the 1930s, Per-and polyfluoroalkyl substances (PFAS) have widely been used in industry for their waterproof properties in household products (carpets, clothing, non-stick pans, paints, etc.), personal care products (shampoos, dental floss, cosmetics), food packaging and fire extinguishing foams. Exposure to PFAS poses a significant health concern due to their long biological half-lives. Human exposure can occur through consumption of contaminated drinking water, house dust, food, and food packaging. Recently in vivo studies have shown that Perfluorooctane sulfonate (PFOS), a type of PFAS chemical, can be neurotoxic, specifically targeting dopaminergic neurons. However, the mechanism of neurotoxicity remains unknown. Oxidative stress is one possible mechanism for neurotoxicity. We hypothesize that PFOS exposure could lead to an increase in oxidative stress resulting in the damage to dopamine neurons. The goal of this study was to determine if exposure to PFOS increased reactive oxygen species, namely hydrogen peroxide. Caenorhabditis elegans is well-characterized animal valuable model because of its rapid life cycle. For this study, Larval stage 1 (L1) C.elegans were treated with 0 (control), 50, 100, 150 uM concentrations of PFOS and allowed to develop to larval stage 4 (L4) on NGM plates seeded with E. coli. Thirty L4 worms from each treatment plate were collected into wells of a 96-well plate and exposed to amplex red reaction mix. The Amplex™ Red reagent (10-acetyl-3,7-dihydroxyphenoxazine) was used to detect the presence of hydrogen peroxide (H_2O_2) in worms compared to a standard curve of known hydrogen peroxide concentrations (1-20 uM). The hydrogen peroxide present reacted with Amplex red reagent to produce a red fluorescent excitation product (resorufin) that was measured spectrophotometrically. Our data collection indicates that hydrogen peroxide levels increased with exposure to the highest concentration of PFOS (150 uM) relative to control (0 uM). These findings support the hypothesis that PFAS exposure can increase oxidative stress, which may lead to neurotoxicity. Future studies will examine if PFOS increases the production of other reactive species, including superoxide. In conclusion, this study further reiterates the need for limiting exposure to these PFAS chemicals.

<div align="center">PSUG12</div>

REPRESSION OF RPS15 LEADS TO DIVERSE TRANSCRIPTIONAL RESPONSES IN SACCHAROMYCES CEREVISIAE

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Ribosome biogenesis is a complex, highly-regulated process that dominates cellular activity. Disruptions of ribosome biogenesis have dramatic effects on cellular activity that include a four-pronged response to nucleolar stress, which include the reduction of ribosome synthesis, degradation of incomplete ribosomes, induction of chaperonins, and cell-cycle arrest. While some elements of the cellular response have been elucidated, the molecular links between ribosome biogenesis and cell-cycle regulation has remained elusive. Using a repressible RPS15 (ribosomal protein S15 gene) to reduce S15 transcript levels and disrupt ribosome biogenesis, we examined the genome wide transcriptional effects of this disruption and discovered a broad range of physiological changes that occur independently of translational collapse. We identified 1708 differentially expressed genes (DEGs), that affect multiple cellular processes. The trends in gene expression during the cellular response showed three major foci; restoring ribosome synthesis,

conserving energy, and cell-cycle arrest. Significantly, genes not prominently featured in existing nucleolar or ribosome assembly stress response models were implicated. Specifically, the G1 cyclins, Cyclin-1 (CLN1) and Cyclin-2 (CLN2) were implicated in the cell-cycle aspects of the response. Fork Head-Like-1 (FHL1) and Co-Repressor with FHL1 (CRF1) are implicated as mediators of the control of ribosome synthesis. While a tremendous amount of detail remains to be fleshed out, we have established a skeleton on which to build the body of Nucleolar and Ribosomal Stress Response (NARSR) model.

PSUG13

SELENIUM APPEARS TO DRIVE AMENSALISM AMONG BACTERIODES IN HUMAN GUT MICROBIOME

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Resident microbes that compose the human gut microbiome play important roles ranging from cellular metabolism to cellular immunity, among other functions. The commensal existence of trillions of resident microbes depends on a myriad of factors including nutrition. Selenium is a trace element not produced endogenously, but has essential roles in cellular redox reactions and immune functions (synthesis of thyroid hormones). Our studies characterized in vitro selenuim deprivation on Bacteroides fragilis (B. fragilis), resident microbe of the human colon. In the presence of the E. coli (indicator strain), a gradual selenium deprivation stress test led to a correlative increased mortality of E. coli. These preliminary studies appear to indicate that selenium is also important in maintaining the human gut microbiota.

PSUG14

FUNGAL PLANT PATHOGEN DETECTION USING UV REFLECTIVE POWDER

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Most plant diseases are fungal and the disease they cause arises from the dispersal of spores (5 to 20 microns) onto plants that spores can germinate and infect. Day lily rust is one of these diseases which is transferred from infected plants to healthy plants through aerially dispersed spores. It is difficult to study spore dispersal because the spores are small and appear under a microscope like any other small particle. We experimented with a UV reflective powder (particle size 5 to 20 microns) to see if the powder could be used as a substitute for fungal spores' disease. If we can use different colored florescent powders as a substitute for fungal spores, the method opens an entire aspect of plant epidemiology that has never been studied.

To see if UV fluorescent powder could be used as an early detection for the spread of plant pathogens, we followed this method.

1) Determined the best solvent to mix the powder so it can be applied and dried on the leaf in a way that spores produced by a rust would. 2). Developed the application method for the mixture of 90-10 (you tried multiple things but settled on the micro applicators). 3). Designed a way to sample the particles in the air

by creating artificial leaves out of the overhead transparency. 4). Set up the day lily array with the source plant (the plant that contained the applied dots of powder) and the three plants that you sampled to see where the powder particles were dispersed when you created your own wind (fan). 5) Counted the powder particles underneath the dissecting microscope under UV light.

Our wind dispersal experiment suggested that the UV reflective powder can disperse from a plant source and be detected on artificial leaves with patterns that are like fungal plant disease spores

We observed patterns of particle dispersal that looked like what is observed in studies of plant disease in nature. Our results in this experiment suggest that the UV fluorescent powder provides a way to study plant disease spore dispersal without introducing an actual disease into a farmer's crop. Because there are multiple different UV colors, the powders and their application onto different plant locations and portions of the stem and leaves, will enable plant epidemiologists to study important aspects of spore dispersal which have never been studied before. This is because spores of single and multiple diseases look the same, so we cannot attribute captured spores to their precise origins. However, the UV reflective powder will enable us to perform more precise experiments, potentially changing the field of plant epidemiology.

PSUG15

A STUDY OF THE SUSCEPTIBILITY OF THE REPRODUCTION AND MORPHOLOGY OF DANIO RERIO TO AMMONIUM NITRATE TOXICITY

Dejanah Lorthe. Norfolk State University, VA

Agricultural water pollution is a major environmental issue that causes detrimental effects in growth development in aquatic organisms that originates from industrial and anthropogenic activity. Environmental pollution has contributed to the increased toxicity of pollution in most water systems. Ammonium nitrate is a form of agricultural pollution that stems from plant fertilizers, land runoff after depletion, pesticides, and brush fires. Ammonium nitrate pollutant has been determined to cause negative effects on growth development and reproduction in aquatic organisms. In this study Danio rerio, zebrafish were placed in 4 tanks with 3 females to 1 male ratio, containing 26L of treated water with aqueon filters and 10mg/L of ammonium nitrate mandated by the Environmental Protection Agency and two designated control tanks. Danio rerio zebrafish used in this study are freshwater organisms originating from midwestern India, prime model organisms for biomedical research, in fields of molecular genetics, toxicology, and biology and have helped scientists in various drug discoveries. The hypothesis of this study is ammonium nitrate toxicity derived from agricultural pollution will have an effect on the reproduction and morphological physiology of fish,

The parameters monitored daily were the pH levels, mating behaviors, temperature, and nitrate levels. Ammonium nitrate pollutant was added daily for a three-week period for bioaccumulation. The bioaccumulation of the ammonium nitrate contributed to increased toxicity levels and was a dependent variable on the decreasing pH of the polluted tanks. An analysis of the ammonium nitrate tank water was performed using Ultraviolet visible spectroscopy determining the absorption rate of bioaccumulation was 83.3%. The study correlates and observed the decreasing pH of 5.0 with the high levels of nitrates in ammonium nitrate absorption.

The nitrate levels between 50-80ppm, exhibited the highest mortality rate of 80% in male zebrafish and 50% female zebrafish. Nitrate levels were tested using an API NO3- kit for polluted tanks. The reproduction habits were observed in this study demonstrated the females were a not able to complete gestation for developing eggs polluted tanks. Fertilization of the eggs was incomplete due to ammonium

nitrate toxicity levels resulting in mortality with eggs in vivo. A morphological analysis of the gills was examined by dissection demonstrating gill lamellae hypertrophic conditions. A histological analysis was performed on the liver determined the ammonium nitrate resulted in apoptosis of hepatic cells. The importance of this study is to understand agricultural pollutant ammonium nitrate toxicity effects on the physiology and overall health of fish. Monitoring pollution is essential in the liver and the gills play an essential role in nitrogen waste removal in fish. our nation's waterways to protect the health and vitality of the food chain of aquatic organisms and humans.

PSUG16

COMPUTATIONAL ANALYSIS OF UDP-GLYCOSYLTRANSFERASE VARIATION ACROSS STRAINS OF CAENORHABDITIS ELEGANS

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Caenorhabditis elegans is an ideal model organism due to its' amenability, cost effectiveness, and rapid reproduction rate. However, little is known about the UDP-glycosyltransferases (UGTs) responsible for their innate detoxification response. UGTs are a large family of phase II enzymes involved in detoxification in many different species. UGTs interact with small molecules in the worms' environment including toxins. The Edison Vertically Integrated Projects (VIP) Computational Team is a group of undergraduate students who are working to identify the diversity that exists in UGTs across C.elegans isolates found in the Caenorhabditis elegans Natural Diversity Resource (CeNDR) database in order to make inferences about the relationship and function of various proteins, including those responsible for detoxification. The CeNDR database is a collection of wild isolates of C.elegans and their genomic data is globally used by researchers worldwide. Out of the 250 glycotransferases that are responsible for transferring sugar molecules to various substrates, there are about 79 UGTs that transfer sugar molecules to small molecules including toxins. Two approaches were implemented to identify UGTs and make inferences based on their variation. First, we created a catalog of UGTs in the N2 reference strain and used them to create a phylogenetic tree that allowed us to depict the relationships between the UGT protein sequences. For our second approach, we quantified UGT variation using the strains found in the CeNDR database. The results and inferences from this research will help us explore possible functions of UGT genes and improve our understanding of UGT variation in C.elegans.

PSUG17

THE COMPUTATIONAL STUDY OF PHENOTHIAZINE ANTIPSYCHOTICS AS POTENTIAL ANTI-TUMOR DRUGS

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Cancer patients are developing resistance towards cancer treatments every day. As we speak, there are countless treatments being explored. In previous studies, antipsychotic drugs were noticed to potentially work as antitumor agents because they target some of the signaling pathways associated with tumor development. The purpose of this research is to determine what molecular interactions specifically contribute to the binding of the ligands to biomolecular targets found in those signaling pathways. Using computational chemistry, molecular properties were calculated to get a better understanding of some potential binding sites and interactions between the targets, AKT 1 (Protein Kinase B) and AMPK (Activated Protein Kinase) and compound derivatives containing the phenothiazine moiety. There were six compounds that demonstrated stable interactions with the two targets. The compound A17 had the highest binding affinity of -8.8 kcal/mol to the AMPK target. The compounds A11 and A18 had the highest binding affinity of -8.4 kcal/mol to the AKT 1 target. In conclusion, our results indicated that the oxygen on the carbonyl group was a key binding site on the ligand compounds. Results also revealed a common functional group (-NH) as a potential site of interaction in at least one of the compounds with the highest binding affinity.

PSUG18

REDUCING THE RISK OF SIDS IN NASHVILLE, TENNESSEE

Jordan Smith. Fisk University, Nashville, TN

The purpose of this study was to provide health information to African American women between 18-25 who attend a Historically Black College/University regarding infant mortality to hopefully reduce the risk of this disparity from occurring, as this demographic is disproportionately affected by this inequality. The purpose of this study is also to inform African American women of how this health disparity currently affects this demographic after the rise of COVID-19.

The research participants were recruited through social media and word-of-mouth. The informational sessions were separated into two days. To begin, each participant was given a pre-test and a poll that explored their knowledge on infant mortality. Then, an informational presentation described what infant mortality is and how safe sleeping habits for infants reduces the risk of SIDS. Afterward, a post-test was given to show how much each participant learned. To ensure that participants' pre and post instruments were matched, yet refrain from collecting identifying information, individuals were asked to type the street portion of their address and their initials on both. Since the event took place virtually via Zoom, the surveys were administered via Google Doc.

By the end of the presentation, according to the survey results, 100% of the participants understood the definition of infant mortality and recognized its major causes. Over 85% of the participants understood the connection between exclusively breastfeeding and the reduction of infant mortality. Furthermore, all the participants recognized that nutrition and safe sleep were important areas to address when seeking to reduce the chance of infant mortality. Finally, there was a 144% increase in attendees from 2021 to 2022.

The majority of participants who responded to the social media posts and actively attended the information session were African American women attending an HBCU at the undergraduate level. Also, over 95% of the attendees were between the ages of 18 and 22.

PSUG19

DOMESTIC VIOLENCE AND MENTAL HEALTH AMONG YOUNG AFRICAN AMERICANS

Alecsis Taylor. Fisk University, Nashville, TN.

The purpose of this study was to enlighten young African-Americans 18 years or older who attend a historically black college or university (HBCU) on domestic violence and its influence on mental illness development. Participants were also informed of impacts from the COVID-19 pandemic on domestic abuse cases. Participants represented various socioeconomic backgrounds and were also provided information on local resources.

Participation in this study was solicited through various social media platforms including GroupMe and Instagram. Participants joined a zoom session with facilitation by the YWCA of Nashville and Middle Tennessee. Before the presentation, participants completed a waiver and anonymous pre-survey. During the presentation, a YWCA representative spoke about domestic violence and highlighted key statistics that were included in the pre-survey. Participants were given the opportunity to ask questions and voice concerns and/or opinions on the information provided. Afterwards, participants completed an anonymous post-survey with the same questions from the pre-survey. In order to match pre and post-survey responses without collecting identities, participants put the numerical portion of their home address with their initials on the survey. Also, this was the third year of this intervention in tandem with the YWCA and each year was an increase in participants. In fact, the breakdown is as follows: 2020-14; 2021-24; 2022-185. It is believed that the increase in attendance is largely due to heavier social media promotion in 2022.

The presentation successfully increased the awareness of the majority of attendees regarding domestic violence and its impact on mental health in addition to available resources. There was a 27.8% increase of those who strongly agreed with the statement, "I can accurately define and recognize signs of domestic violence".

Domestic violence is a growing epidemic. Many young African-American adults may struggle with recognizing abuse, or are unaware of its influence on mental health. Additionally, some might not be aware of available resources or how to seek help. This presentation, however, increased knowledge and hopefully influenced young African-Americans to take the right steps towards safety when experiencing abuse.

<div align="center">PSUG20</div>

BREAST CANCER AWARENESS & COVID-19 AMONG AFRICAN AMERICAN WOMEN

Trinity Upshaw. Fisk University, Nashville, TN

The purpose of this study was to raise awareness about breast cancer disparity among African American women in the Nashville, TN community. Also, a goal was to shed light on consequences of late detection, family history significance, lack of resources (health insurance, finances, etc.), and availability of treatment options. Finally, individuals from underrepresented communities can have a better prognosis with more knowledge of the disease and identifying where care can be obtained.

To begin, participants were solicited through the GroupMe app. Next, participants attended a virtual, educational event via Zoom where they were given a pre- test upon arrival. Subsequently, a breast cancer researcher facilitated the session where guests were allowed to gain knowledge on breast cancer awareness regarding the disease, including ways to lower risk, and encouraged participants to complete annual breast cancer screenings (if they fall in the category) since studies have shown early detection saves lives. Furthermore, a physician spoke about the correlation between the increased risk of COVID-19 in women/men with breast cancer, due to their immunocompromised systems. Finally, they were issued a post-test to find if there was a change in knowledge. Additionally, individuals who completed both the pre-and post-surveys were entered into a drawing for a gift card.

This study found that over 70% of participants learned valuable information they had not known prior to the session. Furthermore, over 90% of the participants had an increase in their scores from the pre-test to the post-test surveys. Finally, 100% of the participants felt that they gained valuable information during the awareness event. Lastly, there was a 233% increase in participants from 2021 to 2022, with over 150 attendees this year.

Creating a virtual event for college-age African American women focused on breast cancer provides awareness to a demographic rarely targeted. Consequently, by arming them with breast cancer basics and mammogram timelines, this knowledge can assist participants with possible early detection in the future.

PSUG21

COVID-19 AND ITS EFFECTS ON MENTAL HEALTH: ADHD IN AFRICAN AMERICAN COLLEGE STUDENTS

Mauryce Thomas, II. Fisk University, Nashville, TN

The purpose of this study was to raise awareness about ADHD to African American college students 18 years or older who attend Historically Black Colleges and Universities and Predominately White Institutions in the Nashville, TN area. Also, this study aimed to increase knowledge about ADHD and how that affects African American college students. Finally, this study set out to share COVID-19 effects on ADHD among college students.

The participants in this research were recruited through promotion using electronic flyers, social media platforms: Instagram and GroupMe, and word-of-mouth communication. Next, at the beginning of the event, participants received an informed consent form to ensure their willingness to participate in the research initiative. Next, participants were given a pre-test electronically through Google Forms to determine prior knowledge of ADHD and other learning disabilities. Then, a PowerPoint presentation was given by a psychiatric health professional with Emory University that discussed learning disabilities, diagnosis information, and treatment options. Finally, participants took a post-test to determine if knowledge was gained from the event. Also, ADHD resources were shared with the group. Additionally, to ensure that participants' pre and posttest were properly matched while refraining from accessing identifying information, individuals were asked to provide their initials (first, middle, and last) on both tests.

Through a variety of recruitment methods, 102 individuals within the target demographic attended the event. Also, 96.1% of attendees reported via their survey an increased knowledge of ADHD risk factors and treatment options. Even more, 100% of participants reported that they learned something new regarding ADHD and COVID-19.

Creating a research intervention focused on ADHD among college students proved beneficial as many participants identified they had two or more symptoms of ADHD. Further, a large group of participants believed they may have an undiagnosed learning disability according to the information provided and past educational history. Thus, hosting events regarding ADHD amongst African American college students can be a helpful tool in students being diagnosed, identifying resources, and receiving assistance to have more satisfying learning experiences.

DIABETES AWARENESS: DECREASE AND LOWER THE RISK OF THE FRESHMAN FIFTEEN

Rhyan Hewlin, Fisk University, Nashville, TN

The purpose of this project is to educate college students about the prevalence of diabetes and the impact of genetic factors, diet, and exercise. College students are prone to diabetic disease due to an increase in weight upon their entrance into their perspective institutions. Therefore, it is important to inform them about diabetes in order to establish a preventative plan to help decrease the number of diabetic cases among college students. Also, in this new COVID-19 society, the effects of COVID-19 on those with diabetes was examined.

To begin this study, participants were sought through the use of social media and the Group Me messaging app. Next, the participants attended a virtual educational session via Zoom. The virtual session began with a pre-test where the participant's previous knowledge about diabetes was measured. Following the pre-test, an educational session was led by a diabetes researcher, participants were able to gain knowledge about diabetes, including ways to decrease their risk of the disease, proper diet and exercise methods, and they were given the awareness of genetic factors that are associated with Types I-IV of diabetes. After the completion of the educational session, participants were given a post-test to assess their overall knowledge gained through the educational session. Finally, participants were entered into a draft for the completion of both the pre and post-surveys.

This study found that 29.2% of the freshmen college students who attended this event, were able to gain relevant knowledge from the informational session. Therefore, this will help the students create a preventative plan as they further their education at the institution. After attending the session, 30.4 % of the freshmen students knew more about the diabetes disease.

The creation of a virtual event to promote the awareness of diabetes allowed for college students to gain relevant information. It increased their overall understanding and outlook of the disease. The students were engaged and were able to retain information in order to implement a preventative plan in their life to lower the risk of diabetes. The students were also taught to look for certain signs, symptoms, and genetic factors associated with the disease to become more aware of the risk factors. Overall, this event educated a large population of college-aged students about the importance of diabetes awareness.

WHY DO AFRICAN-AMERICANS HAVE THE MOST STROKES?

Allyson Merriweather. Fisk University, Nashville, TN

The purpose of this study was to inform African-American college students that reside in the Nashville, TN community about the causes and risk factors that can lead to strokes. The goal was that African-Americans participating in this study learn about the risk factors associated with stroke. In effect, the primary focus was for attendees to have an increase in knowledge and change in attitudes and behaviors regarding stroke prevention. In addition, discussing COVID-19's effects on stroke was included as individuals with other health disparities, including hypertension, have increased complications in relation to COVID-19.

Participants were solicited through social media avenues such as Instagram and Group Me to attend the virtual event via Zoom. Before the start of the event, a pre-test was administered, and participants were asked questions related to stroke to measure their knowledge of the topic. During the event, a medical doctor gave a presentation that highlighted genetics, African-American culture, socioeconomic status, and risk factors which all lead to significant cases of stroke within the African-American community. At the conclusion of the presentation, a post-test was given to measure if knowledge was gained from the presentation.

The results of the study showed that the participating individuals gained valuable knowledge. There was a 66% increase in knowledge among the participants. Results also show that 100% of the participants learned at least one piece of new information from the presentation. Also, through substantial social media promotion, 155 individuals participated.

The intervention provided stroke awareness to the African-American community and supported the hypothesis that participating individuals would gain knowledge on the topic. African-Americans are at a higher risk of stroke than any other race because more than ⅔ of them experience one or more stroke risk factors; this proves there was a need for the intervention.

PSUG24

MATERNAL AND INFANT MORTALITY IN AFRICAN AMERICAN WOMEN

Vichelle Johnson. Fisk University, Nashville, TN

African American women and infants experience mortality at a disproportionate rate. This study aimed to raise awareness while highlighting many different factors that contribute to this reality. Thus, providing relative health information to a population that is unequally affected, will hopefully have a long-term impact on infant mortality rates in the African American community. Additionally, this intervention addressed COVID-19 and its effects on infant mortality.

At the beginning of the event, surveys were dispensed to gain a baseline knowledge of participants. Next, a health professional from Swope Health gave an informative presentation regarding infant mortality among African American women that included prevention methods. Next, a post survey was administered to ascertain if there was a change in knowledge. Moreover, the surveys were able to determine if the target demographic (African American women 18 – 25 from any socioeconomic background) was reached.

After analysis, the pre-survey results showed that over 90% of participants were aware that maternal and infant mortality rates are highest among African American women and babies. However, over 75% of participants were unaware of the primary risk factors of infant mortality according to the pre-survey. Additionally, the post-survey revealed that participants retained qualitative information better than quantitative. For example, they easily recalled attributes of this disparity rather than specific statistics. Furthermore, the 79 participants showed a significant increase in knowledge of the risk-factors of infant mortality at the end of the presentation.

The results support the previously stated purpose which is shown through the increased knowledge exemplified in the post surveys. With the health information provided through the presentation, attendees should be more aware of infant mortality risk-factors before and during pregnancy. Even more, with the findings showing over an 60% increase in knowledge, the hope is that this will change behaviors of participants in the future to help reduce infant mortality numbers amongst African American women.

HYPERTENSION AND STROKE AWARENESS AMONGST AFRICAN AMERICANS

Imani Douglas. Fisk University, Nashville, TN

This study aimed to increase dialogue and understanding of hypertension and the possible effects social and behavioral changes can have on its progression and regulation. Additionally, this study introduces the significance of the long-term effects of hypertension, specifically cerebrovascular accidents, to a research population of adult African Americans in Nashville, TN. Ultimately, the objective was to provide an opportunity for participants to communicate with each other and medical professionals to explore hypertension, medicine, and their personal history in a post-COVID-19 environment.

The study consisted of two sessions, with the first session conducted in March 2022 with 63 participants and the second occurring in November 2022 with 168 participants. Recruitment for both virtual events involved the dissemination of e-flyers and banners through several social media outlets. During each session, knowledgeable speakers on the subject guided participants through activities and informational slides. Data were obtained through pre and post-tests to examine the participants' understanding of fundamental content related to the presentation. In addition, the questions posed by the participants were recorded as a supportive measure of participation and reception.

The average pre-test score in Session 1 was reported to be 64%, while Session 2 featured an average pre-test score of 54.4%. Comparatively, participants scored at similar rates in their post-tests, with Session 1 having a post-test accuracy rate of 77.7% and Session 2 having an 80% post-test accuracy. An increase in response accuracy was shown between Session 1 and Session 2's pre and post-test. The average score rose 13.7% in Session 1 and 25% in Session 2.

 The questions highlighted increased knowledge regarding the factors that contribute to hypertension, the severity of the condition, and preventative measures. By creating a virtual event for adult African American men and women focused on hypertension, knowledge, attitudes, and behaviors can significantly change to improve individual health outcomes. As indicated in the post-test and Q&A section of the presentation, this project assisted in empowering attendees to lower their risk of hypertension.

ALUMINUM-ION BATTERY: A CASE STUDY OF IONIC LIQUID ELECTROLYTES

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Renewable energy is expanding along with a high demand for electric vehicles (EVs) and the power grid. To meet the new needs for better energy storage, battery technologies are being explored outside of Li-ion batteries, which currently dominate the markets for consumer electronics and EVs. Al-ion batteries are considered an efficient way to store the energy produced by intermittent energy resources (solar and wind etc.) for future usage. The low cost, abundance, and low flammability of Al metal make it an ideal battery candidate; however, one key challenge in the development of viable Al-ion batteries is the creation of one with a long battery life cycle. The present study investigates ionic liquid electrolytes with various ratio combinations of anhydrous aluminum chloride ($AlCl_3$) and 1-ethyl-3-methylimidazolium chloride ([EMIm]Cl) or 1-butyl-3-methylimidazolium ([BMIm]Cl). The prediction was that the smaller the ionic liquid electrolyte ratio of ([EMIm]Cl), the more charge/discharge cycles the battery would obtain creating

a longer lifecycle of a Al-ion coin cell battery. Creation of the cathode involved the making of a slurry with the key components: graphite, carbon black, and PVDF binder. Designing the proper anti-corrosive coin cell body was taken into consideration. The choice of using a conductive polymer coating was the best option to protect the metallic battery components. Electrochemical characterization and life cycle determination of different AlCl3–[EMIm]Cl molar ratios (AlCl3: [EMIm]Cl=1.3:1, 1.6:1, and 1.9:1) were performed in addition to scanning electron microscopy, transmission electron microscopy, X-ray diffraction, and Raman spectroscopy. A comparison of the three ratios revealed the AlCl3: [EMIm]Cl=1.3:1 combination had a higher discharge capacity. A further comparison of AlCl3: [BMIm]Cl=1.3:1 to AlCl3: [EMIm]Cl=1.3:1 indicated that the AlCl3: [EMIm]Cl=1.3:1 ratio showed better electrochemical performances. While the results of this study show promise, future work will include more fundamental insights into ionic liquid electrolyte design and composition-charge transfer relation in Al-ion batteries.

PSUG27

UNDERSTANDING THE RESPONSE AND LIMITS OF THE EXTREMOTOLERANT FUNGUS, KNUFIA PETRICOLA, TO DESICCATION STRESS

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The rock-inhabiting fungus Knufia petricola (K. petricola) is a morphological group of ascomycetes. These species have melanin pigmentation while lacking recognizable sporulation. The model organism K. petricola is a polyextremotolerant black fungus that provides insights into how eukaryotic organisms have evolved to survive in hostile environments. These extremotolerant fungi can be xerotolerant to some extent under conditions of limited water availability. However, this resistance is relatively low compared to some other forms of extremotolerant black fungi. The aim of the project was to generate stressor-sensitive strains of K. petricola and to investigate its survival under limited water conditions. Our studies showed that K. petricola could survive in a medium with a water activity level as low as 0.94, thus making it moderately resistant. K. petricola was subjected to desiccation stress imposed by reducing the water available in media supplemented with glycerol. It was shown that reducing water availability corresponds to an increase in desiccation stress and thus a decrease in the survival rate of K. petricola. The study also employed CRISPR-mediated genome editing to delete the homolog of the GPP1 gene, which is induced in Saccharomyces cerevisiae for glycerol biosynthesis and in response to osmotic stress, with the future goal of investigating its role in aiding K. petricola to withstand desiccation stress.

PSUG28 (NC)

ENGINEERING E. COLI FOR PROFUSION OF DRUG-LIKE MOLECULES

Destiny Marcus[1]and Hannah Key[2]. [1]Livingstone College, Salisbury, NC; [2]Davidson College, Davidson, NC.

Nitrogen-containing molecules (amines) are an important class of molecules. More than 50% of drugs contain amines or amine-derivatives. Many amines are chiral, meaning there is more than one configuration of the bonding groups. This is similar to our two hands. The right and left hands have the same parts, but they are configured differently. In the structure of a drug, it is important to create the correct configuration of the molecule. Naturally-occurring enzymes called transaminases are excellent catalysts for creating amine containing molecules in a specific configuration. Our research overall aims to use transaminases to create new amine-containing molecules or to create known molecules with higher selectivity for the correct configuration. In conducting our research, we discovered that the concentration of PLP (a cofactor used by the transaminase enzyme) is a key to directing the enzyme to form the amine product with high selectivity. Therefore, we aimed to learn more about the role of PLP in the reaction, especially because we visually observed the decay of the yellow color of the PLP over time. To monitor the fate of the PLP cofactor, we used UV-Vis spectrophotometry, which can monitor the two forms of the cofactor, which are the PLP (aldehyde) form and the PMP (amine) form. We found that under different reaction conditions, the PLP decayed at different rates. Since it is essential to have PLP remain for the reaction to occur, these studies can inform us about what reaction conditions might best allow the PLP to persist in the reaction.

PSUG29

EXAMINING THE EFFECT OF REDLINING ON PRE-TERM BIRTHS IN MECKLENBURG COUNTY, CHARLOTTE, NC USING ARCGIS STORYMAPS

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Healthcare has been studied as an essential indicator of historically and socially rooted inequalities. Systematic racism discriminates against minorities through policies, rules, and laws. Redlining is an example of systemic racism. Being a serious issue that has hit the black community heavily for many generations, redlining goes deeper than housing and food availability. It affects the health of those within these communities as well. With few hospitals, minorities, particularly black women, face various obstacles to obtain healthcare (e.g., increased hospital wait times, and poor hospital quality). These obstacles have led to higher preterm birth rates among black women, especially those who are in redlined areas. Our data showed that, from 2017-2019, 13.6% of black women experienced pre-term births whereas pre-terms births among white women were 8.8%. The overall average of all races for pre-term births were 10.7%, 3% lesser than the average rate for black women. Another obstacle with carrying a child for full term includes high levels of particulate pollution. ArcGis Mapping showed air pollution, in Charlotte, NC, to be more prevalent in areas heavily populated with people of color compared to other areas. Despite redlining being abolished in 1968, it still has drastically affected many generations and it is still common today as the rate of pre-term births among black women continues at high rates.

PSUG30

THE SYNTHETIC INVESTIGATION OF SILICA MODIFIED POLYMERS.

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Humans create over 40 tons of plastic a year, of which the lack of biodegradation and recycling of these materials continue to have negative effects on the environment. Furthermore, the conventional use of microbes and other chemicals prove to be either too slow to efficiently convert non-biodegradable to biodegradable material or lead to environmental detriment. For that reason, there is a considerable need for biodegradable plastic materials. In this research we investigated the synthetic route to a more biodegradable yet sturdy plastic material. Initially, we evaluated the polymerization of two monomers, pentaerythritol tetrakis(3-mercaptopropionate) (PETMP) and butyl acrylate (BA) with several catalysts such as triphenylphosphine (TPP) and zinc acetate. TPP gave the best result as the reaction was completed in 1hr in comparison to ~5hr with zinc acetate. To enhance the rigidity and thermal stability of this biodegradable material, silica was utilized as an additive. Therefore, 1%, 2%, and 3% silica mixtures of TPP, Xylene, PETMP, and BA were formulated and produced silica modified polymers. Additionally, a stress relaxation test performed indicated that silica significantly increased the viscoelasticity of the polymers.

PSUG31

COMPARING METHODS OF MANUFACTURING PEROVSKITE SOLAR CELLS

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Currently, one of the most promising developments in renewable energy is the perovskite solar cell. This solar cell is approaching a 30% conversion efficiency, outstripping the silicon solar panel by almost 3%. There are a wide variety of techniques for making a perovskite solar cell, including the one-step method, solvent engineering, fast deposition-crystallization, and vapor-based methods. In this study, we compare two methods: one-step deposition and solvent-solvent extraction. Using three sample sets for a total of 21 cells, we found the solvent-solvent extraction method had a success rate of 95% as compared with the one-step method's typical success rate of 70%. Furthermore, the solvent-solvent extraction cells produced a voltage of up to 320 millivolts which is comparable to the one-step method cells producing up to 350 millivolts. Based on our results, we ponder the efficiency of the solvent-solvent method in other solar power mediums, especially non-carbon based solar cells.