GR-P 1

Generic framework for parameter studies in distributed systems

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Computational approaches, such as simulation and modeling, are widely used to extract insights and information from a wide range of domains. These applications are often complex due to the sheer size of the parameter space and long run times. As a consequence, testing and validating such applications is not trivial, moreover, since parameters may come from disparate sources (e.g., command line arguments, environment variables, and/or files). In order to find an optimal or â€œgoodâ€ set of parameters, a parameter study tries out many combinations from the search space. High-performance and distributed computer systems are practical for performing parameter studies due to their large collection of processors and storage resources. The setup, submission, and orchestration of such jobs in computing clusters may be a challenge, particularly to non-programmers or new users. This project presents a Python/C++ framework for conducting parameter studies in a parallel or distributed fashion. The parameter space is defined in JSON configuration files, thus removing from the user the need to create complex submission scripts and having to schedule multiple independent jobs. By providing such capabilities at the user-level, a user can set up parameter sweeps in an easy and quick manner. In several cases, a parameter sweep requires execution of multiple tasks, containing inter-task dependencies. An additional feature of this framework is a lightweight workflow management system, also expressed via configuration files. The contribution of this work is to provide a simple method for performing parameter studies for a variety of application classes, and in turn reduce the turnaround time of results and increase the usage efficiency of the computing resources.

GR-P 2

Calibration Factors for Urban and Suburban Intersections HSM Models for Tennessee

The objective of the study was to determine the calibration factors to adjust Safety Performance Functions (SPFs) of Urban and Suburban intersection facilities in the Highway Safety Manual (HSM) for Tennessee. The HSM predictive models were developed utilizing data from other states hence needed to be calibrated to account for Tennessee local conditions. The Urban and Suburban intersection facilities which were calibrated include the three leg stop controlled, three leg signalized, four leg stop controlled, and four leg signalized. The statewide calibration results showed that the calibration factors were more than 1.00 indicating that the state of Tennessee has higher number crashes than those predicted using HSM prediction models.

GR-P 3

Examining the performance of Weather Research and Forecasting (WRF) model to forecast Hurricane Harveyâ€™s wind field

The challenge posed by the 2017 hurricane Harvey has highlighted the urgent need for the development and adoption of advanced hurricane prediction models. Harvey made its first landfall on 25 August 2017 and caused devastating impact on the middle and upper Texas coast resulting in over $ 180 billion in damages, more than any other natural disaster in U.S history. Contrary to many hurricanes that quickly weaken after landfall, Harvey was unique as it did not move inland quickly but instead stalled over the South and South-East Texas coast for days, producing torrential rainfall, flash and river flooding which were the major cause of devastation. For most hurricanes, wind is the primary meteorological parameter driving the storm surge as it directly forces the wave and storm surge models, and hence the accuracy of their forecast. Different techniques are available for forecasting hurricane winds. Most applications are based on analytical parametric formulations such as the Holland model which represent radial profiles of hurricane winds. However, a typical hurricane is rarely circular making such models often to underpredict the storm surge. In this study, the performance of Weather Research and Forecasting (WRF) model to forecast hurricane Harveyâ€™s wind field is examined. The results of this study are compared with published early advisories for hurricane Harvey provided by National Hurricane Center (NHC) to validate our results.

GR-P 4

Prospect Theory based Behavioral Decision Making

The problem of decision making for hypothesis testing traditionally seeks to optimize an expected utility theory based objective function, such as Bayes risk. However, many modern decision making systems (such as crowdsensing systems) involve human agents, who are known to deviate from expected utility theory based models in the decision making process. The main objective of this work is to characterize decision making rules under behavioral considerations of human agents. Modeling human decision making behavior has been done using Prospect Theory, a Nobel prize winning work that describes human behavior. Our analysis shows that, under cost considerations, the decision rule obtained for prospect theoretic agents significantly deviates from the decision rule that minimizes Bayes risk when the distance between the means of the conditional distributions of the observation under the two hypothesis is smaller than a certain threshold. Numerical results provide insights into our solution.

GR-P 5

Assessing Community Advisory Board Effectiveness

Meharry-Vanderbilt-TSU Cancer Outreach Core:

Assessing Community Advisory Board Effectiveness

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Abstract

The Meharry-Vanderbilt-TSU Cancer Partnershipâ€™s (MVTCP) Cancer Outreach Core (COC) Community Advisory Board (CAB) was created to facilitate input into MVTCP activities and research projects and to promote community awareness of the MVTCP. The purpose of this assessment was to evaluate the Community Advisory Boardâ€™s effectiveness, in terms of CAB member engagement in providing input into MVTCP activities, research projects, and promoting community awareness of the MVTCP. An existing survey instrument, â€œCommunity Advisory Board Effectiveness,â€ was used. CAB members completed a 26-question survey, which measured the level of importance and their level of agreement with indicators of CAB processes and performance. The survey also included one open-ended qualitative item that asked for at least one suggestion to improve the CAB. CAB members completed the survey in person during a CAB meeting or via an online version of the survey. Participation in the survey was voluntary and anonymous. A total of 23 surveys were collected for a response rate of 77%. Descriptive and bivariate analyses were performed and completed on survey items. Qualitative responses were reviewed and summarized.

Research funded a grant from and a NCI/NIH grant # 2U54CA163066-07

GR-P 6

Teacher Perceptions of Implementation and Impact of CASE

The Curriculum for Agricultural Science Education (CASE) is an 80-hour professional development program that prepares teachers to deliver STEM-based CASE courses. Participants experience inquiry-based lesson plans, activities, and supporting resources from the viewpoint of a student and teacher.

Objectives

The objectives of this study were to examine teacher perceptions of levels of implementation and impact of CASE institutes.

Design

The design was a one-shot case study using descriptive survey research. Convenience sampling of those that responded in person or online garnered 386 responses.

Materials and Methods

The lead researcher on this project, a CASE-certified teacher who has credentials and experience for multiple courses, developed a list of questions. These questions inquired about student, teacher, and administer feelings towards CASE and were placed on a paper survey and given out in person at the National FFA Convention. After the convention was complete the surveys were then added to an online survey system and emailed to CASE participants.

Results

A majority of teachers reported complete implementation of CASE and acquisition of all suggested course materials. A majority of teachers reported that CASE cut their planning time in half or by greater blocks of time. Most teachers reported that CASE improved their instruction and their interactions with students. Student and administrator responses to CASE were positive, perhaps because of reported improvements in academics, critical thinking, and science knowledge/skills. Most participants were certified in multiple courses already and intended to certify in more.

Conclusions

Participants that invested time and resources to certify as a CASE instructor implemented CASE fully, and they created a positive impact on key student variables.

Source(s) of financial support

CASE is funded by Cooperative Extension at TSU and by participating individuals and school districts sending participant to the training.

GR-P 7

Consumption pattern of food assistance recipients: findings from a survey of low income families in Nashville metro area of Tennessee

Supplemental Nutrition Assistance Program (SNAP) from the United States Department of Agriculture (USDA) is aimed at providing nutritional security to nearly 46.5 million low income American families through food purchasing assistance via food stamps and vouchers. Additionally, there are other various food assistance and support programs such as Women, Infants and Children (WIC), Farmerâ€™s Market Nutrition Program (FNMP), Senior Farmerâ€™s Market Nutrition Program (SFMNP). However, there has been a debate about whether significant portion of that support is used towards healthy diet by recipient families. Specifically with increasing child and adult obesity problems among poor communities, SNAP has been criticized for failing to meet its goal of nutritional security. The goal of this study is to examine the food purchasing behavior of low income families. The study conducted a face-to-face interview among low income households in Nashville metro area of Tennessee. Information on different food purchase behavior is collected with relevant socio-demographic characteristics of the households; findings are compared between SNAP-recipient and non-recipient, particularly on attributes relevant to healthy food consumption such as shopping for different forms of fruits and vegetables and fruit and vegetable juices. Based on the response from 66 households, mainly from African American communities and using discrete and categorical models, this study tests for the effect of food stamp program participation on healthy food consumption. Then the study discusses implications of the findings for local and national level policies.

GR-P 8

Credit constraint, financing sources, and financial performance: A case from small farms in Tennessee

Agriculture is a major source of livelihood for a large number of people throughout the world. Small farmers and ranchers in America contribute significantly to the economy by ensuring a safe and reliable food supply, improving energy security and supporting job growth and economic development. As important as these small farmers are, they are faced with some issues. An access to capital and financing is one of the important issues. This study aims to understand the major sources of funds and factors affecting the selection of these sources by small farmers in Tennessee. Additionally, study also examines challenges faced in accessing these funds and utilization and management of these funds. This study conducted a primary survey with small farms in Tennessee to collect information about agricultural activities, diversification, production, finance, and risk in 2017. Using 104 total responses, we discuss findings regarding farm financial performance of credit constrained and unconstrained farmers.

GR-P 9

Oppression and Microaggressions during Adolescence

Current U.S. public-school enrollment consist of 52% of students from historically marginalized cultures and is projected to continue to increase through fall 2026 (NCES, 2017). As of Fall 2017, over 1/3 of the diverse student population reports an African American or Black cultural background (NCES, 2017). The CRT framework has been widely used as a framework to study the impact of microaggressions on the learning experiences of students in the academic setting. Researchers suggest that experiences of social pain and interpersonal violence during adolescence can have negative and pervasive impacts on student cognitive, emotional, and social development (Eisenberger, 2011; Steinberg, 2008). The current study seeks to understand how behavioral microaggressions can manifest in the academic setting and impact adolescent development according to the experiences of African American students during the transition from middle school to high school. A mixed methods design will be used to gather qualitative information on student perceptions of microaggressions and learning outcomes in the academic context. The Strength and Difficulties Questionnaire will be used to gather information on behavioral outcomes according to teacher reports and self-reports. It is anticipated that structural equation modeling analyses will be used to predict emotional problems and hyperactivity across four separate time points from 6th grade to the end of 9th grade. Thematic coding analyses will provide more in-depth information to enhance lthe development of culturally cultivating systemwide and classroom interventions. Implications for educators, psychologist, and community advocates are discussed.

GR-P 10

Development of integrated pest management approach to control Phytophthora root rot in field grown hydrangeas

Phytophthora root rot is one of the destructive diseases in oakleaf hydrangea (Hydrangea quercifolia) productions. Experiments were established at Nursery Research Center field plot in McMinnville, TN to determine the efficacy of biorational fungicides and conventional fungicides against Phytophthora root rot in oakleaf hydrangea cvs. Alice, Ruby Slippers, and Munchkin. Plots were inoculated with P. nicotianae infested rice grains and were arranged with a randomized complete block design with four replications. Treatments applied were biopesticides - RootShield PLUS+, MBI-110, IT-5103, OxiPhos and TerraClean + TrerraGrow program and fungicides - Segovis, Empress Intrinsic, and Subdue Maxx. Treatments were applied as drench application starting after transplanting except TerraClean. All of the treatments reduced root rot disease severity compared to the inoculated, non-treated controls. Plots treated in all cultivars with Segovis, Empress Intrinsic, Subdue Maxx, MBI-110, and TerraClean + TrerraGrow program had significantly reduced Phytophthora root rot severity than the other treatments. Hydrangea cv. Alice was most susceptible to P. nicotianae than other cultivars. There were no significant differences among non-treated inoculated control, non-treated non-inoculated control and treated plots in plant weight, root weight, plant height and width. Phytotoxicity and defoliation were not observed in any of the hydrangea plants. This study shows that biopesticides, MBI-110 and TerraClean + TrerraGrow, should be considered alone or in a rotation of the fungicides to reduce the risk of Phytophthora root rot on different oakleaf hydrangea cultivars in field nursery production. This project was funded by USDA-NIFA Evans Allen.

GR-P 11

Biofilm formation of wild-type and pressure-stressed Cronobacter sakazakii and Salmonella serovars and their sensitivity to sodium hypochlorite

Aggregate cells are the predominant physiological mode of bacterial proliferation in food processing and clinical settings and microbial biofilms are responsible for as high as 80% of all bacterial infections. Current study discusses biofilm formation of two pathogenic species on an abiotic surface and validates a decontamination intervention against wild-type and pressure-stressed phenotypes of the bacteria. Four strain mixture of Cronobacter sakazakii and Salmonella serovars were used for biofilm formation for up to 14 days. Biofilm formation/enumeration/decontamination was conducted on surface of stainless steel coupons (finish 2b) at 7 and 25 ÂºC. After removal of loosely attached cells, samples were neutralized using D/E neutralizing broth and separated from coupons using glass beads method, prior to culture dependent analyses. Pressure-stressed phenotypes were prepared by exposing the isolates to sub-lethal elevated hydrostatic pressure at 15,000 PSI (approximately 100 MPa) for 15 minutes. The experiments were conducted in two biologically independent repetitions, as blocking factors of a randomized complete block design and analyzed statistically using OpenEpi software. In excess of 3.26 and 2.17 log CFU/cm2 increase (P<0.05) in biofilms mass of stainless steel coupons were observed during 14 days for wild-type and pressure-stressed phenotypes of Salmonella, respectively at 25 ÂºC. Treatment on days 0, 7, and 14 of biofilm formation were responsible for 2.54, 1.78, and 1.88 log CFU/cm2 reductions (P<0.05) of biofilms of wild-type Cronobacter sakazakii, respectively at 25ÂºC and lead to reductions of 2.76, 1.62, and 0.99 log CFU/cm2 reductions (P<0.05) of biofilms of pressure-stressed Cronobacter sakazakii. Overall, wild-type and pressure-stressed phenotypes of Salmonella serovars and Cronobacter sakazakii exhibited similar biofilm formation capability and sensitivity to the sanitizer.

GR-P 12

Anti-proliferative potential of sweetpotato leaves and stem breast and lung cancer cell lines

Anti-proliferative potential of sweetpotato leaves and stem breast and lung cancer cell lines

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Over the last few decades, researchers have been searching for plant derived medicines. Though much of the focus has been on medicinal herbs, many vegetables such as sweetpotato also have been discovered to have medicinal properties due to their high levels of nutrients and phytochemicals. The aim of this study was to determine the effects of methanolic extracts from sweetpotato leaves and leaves/stem on human lung (A549) and breast (BT549) cancer cell lines. The sweetpotato leaf and stem were obtained from Tennessee state University Organic research farm and extracted using methanol. Alamar blue assay was used to determine if the methanolic extracts from the fresh sweetpotato leaves (cv. All Purple) and leaves/stem (cv. Carolina Ruby) had the potential to affect cell proliferation on the human lung (A549) and breast (BT549) cell lines in-vitro. Tamoxifen was used as the positive control while DMSO was used as the negative control. Sweetpotato leaves of the All Purple cultivar and stem/leaves of the Carolina Ruby cultivar inhibited lung and breast cancer cell growth in a dose-dependent manner. Anticancer activities of these extracts were displayed through their ability to inhibit the growth of cancer cell lines, such as BT549 (breast cancer) and A549 (lung cancer) in concentration--dependent manner. Further studies should be carried out to determine not only the bioactive compounds that may be present in this compounds that produced this effect.

GR-P 13

Sweet sorghum varietal differences as depicted through plant development stages and sugar yields

Four sweet sorghum (Sorghum bicolor L.) varieties, i.e, â€˜Archi Turiâ€™, â€˜Daleâ€™, â€˜Dasht localâ€™ and Topper 76-6 were grown in a greenhouse under controlled environmental conditions. Germinated seeds were grown in seven gallon plastic pots (Nursery Suppliers Inc., Chambersburg, PA; USA) containing professional grow mix (Sun-Gro Horticulture Distribution Inc., Agawam, MA; USA) maintained at controlled temperature (day average temp 18.97Â°C; night average temp 14.48Â°C). Plants were fertilized and watered regularly when needed while the glasshouse was maintained at average of 32.06% relative humidity. It was hypothesized that using plant growth, number and stages of microspore as well as sugar yield data; the best sweet sorghum variety can be identified for biofuel studies. Plant height, boot radius, flag leaf width, panicle length, spikelet length and microspore stages of development were periodically recorded. All four varieties were also compared on the basis of the sugar yield data obtained from each plant. From microspore data, it was concluded that the highest microspores width were observed when harvested from top to middle of the panicle comparing same panicle lengths with minor exception for Topper 76-6 variety. Through plant growth data, â€˜A. Turiâ€™ and â€˜Daleâ€™ Varieties showed gradual decrease in the flag leaf width accompanied by gradual increase in the boot radius while â€˜Dasht Localâ€™ variety showed more uniformity. Juice harvested from each variety showed different Brix0 values ranging highest from Topper (11%), Dasht local (10.6%), Dale (9.5%) to lowest in A. Turi (2.7%). On the other hand, Dale and A. Turi varieties showed better resistance against insect pest infestation in the greenhouse. Based on sugar yield and inect-resistance to data, it can be concluded that â€˜Daleâ€™ variety is relatively most suitable for microspore studies, however, all varieties have potential in the field conditions. Research funded by National Academies of Sci., facilities Agr. College.

GR-P 14

Effect of Insecticide Residual Activity on Prevention of Ambrosia Beetle Attacks

Ambrosia beetles are pests of ornamental nursery crops. Female adult beetles excavate galleries in the wood and introduce symbiotic fungi. Ambrosia beetles are attracted to ethanol released by stressed trees. Current management recommendations include trunk sprays of pyrethroid insecticides every 2 wk. The objective of this experiment was to determine the duration of permethrin effectiveness, which may allow nursery growers to reduce their spray frequency. Tree bolts were sprayed with Perm-Up 3.2EC at 24, 17, 8, and 0 d before deployment, while the control bolts were sprayed with water at deployment. At deployment, bolts were zip-tied to stakes 1 m from the ground and placed along a wooded border in a randomized complete block design using 6 replicates with 5 m between treatments and 10 m between replications. Bolts were then filled with 15 mL of 70% ethanol to attract ambrosia beetles. Bolts were monitored every 2-3 d for new ambrosia beetle attacks until 10 d after deployment. The bolts treated with permethrin at 0, 8, and 17 d before deployment had less attacks than the non-treated controls. None of the bolts treated 17 d before deployment were attacked until 7 d after deployment. Insecticide-treated trees may be protected from ambrosia beetles for 3 wk after insecticide application. We thank USDA-NIFA Evans Allen (TENX-1515-CCOCP) and USDA Floriculture Nursery Research Initiative (agreement number 58-3607-3-984) for partial funding of this project.

GR-P 15

Single cell type proteomics of switcghrass roots for Al tolerance

Aluminum (Al) stress causes a significant reduction in plant growth when grown in acidic soil and forms stunted root systems. To identify the cause of this phenomenon, single cell type proteomics of aluminum treated switchgrass plants was performed. Single-cell-type proteomics provides the capability to reveal the genomic and proteomics information at cell-level resolution. In this experiment switchgrass plants were grown in hydroponic tanks filled with Al-treated and control solutions. After three months of aluminum treatment (800 Î¼M) plants started showing physiological stresses such as declining photosynthetic activities and biomass. Root tips were harvested and thin sections (~10-Î¼m thick, 20 sections per root tip) of root tips were prepared. Epidermal cells (15000â€“20000 cells per tissue type) from the thin sections were isolated under an LCM microscope and proteins were isolated from these epidermal cells and digested with trypsin. TMT labeling coupled with mass spectroscopy was used for the quantitative proteomic analysis of the trypsin-digested proteins from epidermal cells. Results from the proteomic analysis are currently being processed and will help to determine which proteins are being expressed in single cell type.

GR-P 16

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GR-P 17

Effect of potassium on the volatile compounds of parsley (Petroselinum crispum L.) analyzed using electronic nose

Parsley is mainly grown in the Mediterranean region. It is consumed because of its rich nutritional values and anti-carcinogenic properties. The nutrition of parsley may have a significant impact on aroma characterization. Parsley aroma component analysis has been evaluated by various methods such as GC and GC-MS. While these methods may be reliable sources when evaluating such components, newer technology such as electronic nose (e-nose) could possibly improve the findings and also provide a reduction in analysis time. Therefore, a study was designed to evaluate the effect of potassium (K) source and concentrations on parsley leaf aroma. Plants were grown in pine bark (70 %) and peat (30 %) substrate with 3 g.L-1 of dolomitic lime. They were initially fertilized as needed with a water soluble fertilizer (20N-4.4P-8.3K). Treatments consisted of a modified Hoaglandâ€™s nutrient solution containing various concentrations (1.0, 2.5, 5.0, 7.5 and 10.0 mM) of K supplied as potassium (K2SO4) or potassium chloride (KCl) while the remaining nutrients were constant. The plants were fertilized twice over a seven-day period. Fresh leaf samples of young, recently mature and matured leaves were collected and analyzed using e-nose. The e-nose results indicated that there were more than fifteen volatile compounds present while more than 90% of the volatile compounds were identified and reported here. Preliminary analysis using AromaChem software indicated that young leaves had higher tetramethylpyrazine (26.6 %), followed by 1, 8 cineole (25.54 %) and myrcene (20.28 %), the recently matured leaves had higher 1, 8 cineole (28.33 %) followed by myrcene (22.32 %) and tetramethylpyrazine (21.1 %), and the matured leaves had higher benzeneacetaldehyde (26.39 %), followed by tetramethlypyrazine (23.89 %) and myrcene (19.67 %).

GR-P 18

Proteomic Analysis of Biofilm Associated Proteins from Novel Bacillus licheniformis Strain YNP5-TSU Isolated from Yellowstone National Park

The Industrial fermentation industry relies heavily upon unique microorganisms to carry out production of relevant bioproducts. In the case of second generation biofuels there is a need for novel cellulolytic thermophiles. They have the potential to survive many environmental stressors while successfully generating high value bio-end-products. Yellowstone National Park is home to thousands of natural hot springs, each capable of sustaining microbiomes where these thermophiles of interest might be found. In a recent field study under permit# YELL-2015-SCI-6074 several of these hydrothermal areas were sampled using a non-invasive approach to isolate unknown culturable bacteria and fungi. From this a novel strain, Bacillus licheniformis YNP5-TSU, was isolated. Thermophilic conditions were confirmed through growth curve analysis and suggested optimal growth between 45Â°C and 60Â°C. A defined cellulosic media was created to optimize cellulase production during fermentation. From this, Bacillus licheniformis YNP5-TSU demonstrated that optimal cellulase production occurred only when a mature biofilm was present. By testing individual media components it was determined a mature biofilm developed only in the presence of magnesium. LC-MS/MS analysis was used to compare control cultures to those incubated in media with low magnesium concentrations, identifying upregulated and downregulated biofilm associated proteins. These proteins can potentially be targeted to reduce biofilm formation via cell attachment on plants, plastics and food products in order to reduce the use of preservatives and antibiotics.

GR-P 19

Evaluation of Molecular and Biochemical Mechanisms Underlying the Beneï¬ cial Interactions between Biological Control Agents and their Hosts in Tomato

ReEtta Catlin-Brown, Afona, Irabor, Christine A. Ondzighi-Assoume, Margaret T. Mmbaga and Suping Zhou. Funding Capacity Building Grant, USDA

Pesticides provide remedy to fungal problems, however, they also cause toxicity hazards to humans, non-target organisms and environmental quality. The use of selected biological control agents (BCAs), instead of pesticides, can reduce these toxicity hazards since BCAs seem to have different modes of action including boosting plant defense by inducing systemic resistance to pathogens, antibiosis and parasitism. The primary purpose of this study is to identify and evaluate the molecular mechanism underlying the beneficial interactions between the selected BCAs and its plant host by using gene expression analysis (Dual RNA sequencing). The secondary purpose is to characterize biochemical mechanisms that will lead us to identification of potential novel metabolites/gene-products involved in the beneficial interactions between BCA-Pathogen, and BCA-BCA. In our study we utilized tomato plants as the host, however we expect the results to have broad applications on diverse crops and pathogens. In addition, the anticipated outcome of our analyses can possibly be used to identify specific BCAs as alternative products to conventional fungicides. The experimental design of our study employs 2-week-old tomato plants grown from seed treated with eight different strain of BCA. Leaves and roots from 2-week-old host plants were harvested and analyzed through qRT-PCR for the evaluation of the expression of genes involved in the beneï¬ cial interactions between the selected BCAs and its tomato plant host. Current molecular and biochemical analyses are in progress to evaluate the response of tomato plants to the selected BCAs.

GR-P 20

Assessing Root System Architecture of Wheat Seedlings Using High-Throughput Root System Phenotyping

Root system architecture (RSA, the spatial distribution of root system in the soil) is a vital part of the plant for anchorage, nutrient storage, plant-microbe associations, water and nutrient uptake. RSA has been shown to vary between species and within species based on genotypic or response to environment. The root traits of wheat (Triticum sp.) seedlings is critical for the establishment and evidently linked to plant height and seed yield. However, plant breeders have not efficiently developed the role of RSA in wheat selection due to the difficulty of studying root traits in the soil. We set up a root phenotyping platform to characterize root system phenotyping in 30 wheat parental lines (PL). The phenotyping pipeline consists of the germination paper-based moisture replacement system, image capture units, and root-image processing software. The 30 PL of wheat were characterized in ten replicates. This method is allowing us to characterize wheat seedling traits that can be further examined in the field.

GR-P 21

Developing hearth healthy soybeans through mutation breeding

Soybean (Glycine max (L.) Merrill) is considered a key crop of modern agriculture due to its seed's high protein and oil content. However, the high percentage of polyunsaturated fatty acids in soybean oil limits its stability and shelf life. Also these polyunsaturated fats results in an increase in cardiovascular diseases and there is high demand for soybeans with heart healthy fatty acid profile. Modification in the fatty acid composition can improve its stability and nutritional quality. Mutagenesis is a useful tool to induce genetic and phenotypic variation for trait improvement and discovery of novel genes. This study aimed to identify mutants with high oleic and low linolenic acid content, and to screen for mutations in the fatty acid desaturase (FAD2) and microsomal omega-3-fatty acid desaturase (FAD3) genes. JTN-5203 (MG V) soybean mutant population was generated using an induced ethyl methane sulfonate (EMS) mutagenesis. Optimum concentration of EMS was used to treat 15,000 bulk JTN-5203 seeds producing a total of 1,820 M1 individuals. Fatty acid profiles such as oleic acid, linoleic, and linolenic acid were measured in the M2 lines with more than 12g seeds using near-infrared spectroscopy. Oleic acid content in some mutants was increased by up to 40% from 25% in wild type (WT). Linoleic acid in five mutants was reduced to 35% from 49% in WT. Mutants with reduced linolenic acids to 2.9% (WT:7.6%) were also recovered. Moreover, DNA was extracted from the selected top and bottom five lines and primers covering the FAD2 and FAD3 genes were designed. Multiplexing indices and sequencing adaptors will be attached to the PCR products and sequencing will be performed using Illumina Miseq with the paired-end multiplexed library. Through mutagenesis and high-throughput sequencing, the novel alleles underlying the mutations observed in mutants with reduced polyunsaturated fatty acids will be identified, thereby producing an improved soybean with a healthier oil.

GR-P 22

Influence of Veterinary Antibiotics in Micronutrient Oxyanion Mobility in the Environment

Influence of Veterinary Antibiotics in Micronutrient Oxyanion Mobility in the Environment

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Fate of veterinary antibiotics (VA) can be linked to the fate of micronutrient oxyanions such as borate. Long-term persistence of VA in the environment can cause antibiotic resistance and toxicities to plant and aquatic organisms. Likewise, the environmental mobility of oxyanions of micro- (borate) nutrients is important to assess. The VA and micronutrient oxyanion can co-exist in situations, in which animal manure is applied in the agricultural land, fertilizer is applied after manure application, antibiotics is run off or leached from the confined animal feeding operations (CAFOs) to the agricultural land, and untreated surface water or wastewater contaminated with antibiotics is used for irrigation. In these scenarios, strong retention of VA on soil minerals can potentially affect the natural interactions of micronutrient oxyanion with soil surfaces, thereby affecting their fate. Thus, assessing competitive sorption interactions of borate and antibiotics in a binary mixture is exceedingly important. We propose to evaluate the effect of surface retention mechanisms of selected common VAs on model soil minerals and soil clay fractions in mobilizing borate under a range of environmentally relevant solution properties. Macroscopic sorption studies will be coupled with in situ attenuated total reflectance Fourier transform infrared (ATR-FTIR) spectroscopic probes to improve understanding of the surface interaction mechanisms.

GR-P 23

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GR-P 24

Assessing Root System Architecture of Wheat Seedlings Using High-Throughput Root System Phenotyping

Root system architecture (RSA, the spatial distribution of root system in the soil) is a vital part of the plant for anchorage, nutrient storage, plant-microbe associations, water and nutrient uptake. RSA has been shown to vary between species and within species based on genotypic or response to environment. The root traits of wheat (Triticum sp.) seedlings is critical for the establishment and evidently linked to plant height and seed yield. However, plant breeders have not efficiently developed the role of RSA in wheat selection due to the difficulty of studying root traits in the soil. We set up a root phenotyping platform to characterize root system phenotyping in 30 wheat parental lines (PL). The phenotyping pipeline consists of the germination paper-based moisture replacement system, image capture units, and root-image processing software. The 30 PL of wheat were characterized in ten replicates. This method is allowing us to characterize wheat seedling traits that can be further examined in the field.

GR-P 25

Characterizing and predicting site productivity using geocentric approach

Site productivity is a measure of primary productivity potential of a forest ecosystem. It is characterized by an interaction of biotic and abiotic factors such as climate, soil and topography. An accurate site productivity characterization allows for efficient land use allocation, integrated ecosystem planning, and prescribed ecosystem management. Site productivity can be evaluated by using phytocentric, geocentric, and phytogeocentric approaches. Phytocentric approach â€“ site index or the height of dominant or co-dominant trees at a reference age, is an important proxy of site productivity and has traditionally been used in many conceptual and simulation models of ecosystem dynamics; however, it assumed that forest management history has no effects on site productivity. Indeed, forest site productivity is dependent on both site and management related factors. Better management of under-utilized woody biomass from forest such as treetops, branches, twigs, bark, and limbs could be potential sources of feedstock in order to meet the Energy Independence and Security Actâ€™s target to significantly increase biofuel production over the next 15 years. We hypothesized that intensive forest management practices will not only reduce the amount of soil nutrients present, but also affect the site productivity of the managed ecosystem. This study aims to develop predictive models using geocentric approach by pairing Forest Inventory and Analysis (FIA) plot data with forest management history, climate, topography, and soil data across the state of Tennessee. It is important to find a balance between forest management practices and maintaining forest productivity in order to meet the increasing demand for woody biomass, and ensure it will remain a sustainable resource for the future.

GR-P 26

How much forest biomass do we have in Tennessee?

Forests are the sources of cellulosic feedstock that can be used for production of renewable energy. In Tennessee, more than half of land area is covered by the forest; however, the total available aboveground dry forest biomass is unknown. Mapping spatial distribution of woody biomass is prerequisite for a continuous supply of feedstock for biofuel production. Field based inventory is costly and time consuming; thus, there is an opportunity to use remote sensing data for mapping biomass availability at a given time. And, it was hypothesized that variables derived from remote sensing data could be important predictors while estimating biomass from pixel to landscape level. Landsat 5 TM satellite imagery, national land cover dataset, and digital elevation model for Tennessee were acquired. Different vegetation indices were derived using Landsat data. Forest Inventory and Analysis (FIA) data from 2007 to 2011 were used to calculate plot level biomass using Jenkins equation. Biomass data were extracted by pairing FIA plot with spatially referenced layers. Non-parametric approach â€“ random forests was used to build predictive model for biomass. The models explained 39% of variability for biomass with RMSE of 18.46 tons per acre. Canopy cover, vegetation indices from leaf-on period such as Normalized Difference Vegetation Index (NDVI), and Simple Ratio Index (SRI), and tasseled cap (wetness) were found to be important variables for biomass prediction. Map modeling method was used to generate a continuous gridded biomass raster map across the state of Tennessee, which can be useful for long-term planning of forest-based woody biomass.

GR-P 27

Genotyping by Sequencing (GBS) Polymorphisms in Grain Amaranth and Close Relatives

The genotyping by sequencing (GBS) method has become a molecular marker technology of choice for many crop plants because of its simultaneous discovery and evaluation of a large number of single nucleotide polymorphisms (SNPs) and utility for germplasm characterization. Genome representation and complexity reduction are the basis for GBS fingerprinting and can vary by species based on genome size and other sequence characteristics. Grain amaranths are a set of three species that were domesticated in the New World to be high protein, pseudo-cereal grain crops. The goal of this research was to employ the GBS technique for diversity evaluation in grain amaranth accessions and close relatives from six Amaranthus species and determine genetic differences and similarities between groupings. GBS complexity reduction by ApeKI and 25 Gb of Illumina sequencing information with over 10 X coverage were used to detect SNPs based on sequence alignment. A total of 10,668 SNPs were discovered in 94 amaranth accessions and were used in current analyses. The distance matrix based on shared alleles provided information on the relationships of two of the related grain species from Mexico, Amaranthus cruentus and A. hypochondriacus, and their relationship to another grain amaranth, A. caudatus, originally domesticated in South America, and its relative A. quitensis, compared to an outgroup with two wild species, A. powellii and A. retroflexus. The information generated was very useful for diversity evaluation and produced SNP sequences that can be used for marker development in this â€œancient cropâ€ which is being rediscovered as a healthful alternative to monocot grains.

GR-P 28

Microbiological Safety of Fresh Produce Collected From Small-Acreage Farms Across Tennessee

The role of fresh produce in human exposure to antimicrobial-resistant bacteria is a growing food safety concern. However, contribution of these bacteria by produce from small produce farms is still unclear. This study assessed the microbial quality in produce and food safety practices in small-scale farms. The microbial quality of produce collected from 15 farms was determined by standard quantitative and biochemical techniques. The antimicrobial-susceptibility of bacteria was determined by Kirby-Bauerâ€™s disc diffusion method. The mean Aerobic Plate Count (APC) ranged from 3.1 to 6.3 log CFU/g. The APC count in leafy produce and herbs (5.2 to 6.1 log CFU/g) was significantly higher (P < 0.05) than that of fruit type produce (3.2 to 4.0 log CFU/g). Total coliforms in carrots (3.6 CFU/g) were significantly higher (P < 0.05) than in lettuce (2.9/CFU/g), strawberries (2.5 CFU/g), and apples (2.1 CFU/g). Escherichia coli levels for most produce were extremely low and typically below the detection limit (â‰¤ 10 CFU/g). The results demonstrated that produce harbored diverse bacterial communities which was dominated by Escherichia coli (29.7%), followed by Serratia liquefacians (13%), Klebsiella pneumoniae (11.4%), Proteus mirabilis (10.8%), Pantoea spp. (8.1%), among others. Salmonella (2.7%) and Shigella (0.5%) were also isolated from the produce. No Escherichia coli O157:H7 was recovered in any fresh produce. Overall, Antimicrobial resistance was highest for erythromycin (22.3%), followed by ampicillin (19.6%), streptomycin (12.8%), and amoxicillin (10.3%). Our findings indicate that fresh produce from small farms harbor antibiotic resistant bacteria and could position consumers at greater risk for foodborne illnesses. Food safety education and written food safety plans are important steps toward minimizing the risk of produce contamination on small produce farms.

GR-P 29

Carbon Sequestration Potential of Intercropping Biofuel Feedstock in Managed Loblolly

Abstract

Removing atmospheric carbon (C) and storing it in terrestrial biosphere is one of the potential options to alleviate greenhouse gas emissions. Agroforestry system, with its higher environmental benefits, has recently gained attention as a sustainable landuse strategy for biological C sequestration. The extent of C sequestrated in any agroforestry system highly depends on a number of site-specific, biological, climatic, soil and management factors. Intercropping of Switchgrass (Panicum vigratum L.) within loblolly pine stands offers potential synergy for biomass production and C sequestration on marginal land. Very few studies have quantified site specific potential of C sequestrated under the intercropping of the plants with divergent growth habit and architecture. The objective of this paper was to determine the potential C storage of intercropping system of loblolly pine and switchgrass flood prone area near the Cumberland River. A randomized complete block design; planted within three experimental blocks and three levels of the intercrop were used. The three levels of intercrop are; switchgrass interplant with pine trees, switchgrass without pine trees and pine trees without switchgrass. The study was conducted for five different soil horizon 0-10cm, 10-20cm, 20-30cm,30-50cm and 50-100cm. Preliminary results, suggests that intercropping stands has sequestrated higher amount of soil organic C (SOC) as compared to monocropping stands of respective crops. Assessment of the effects of intercropping Switchgrass with loblolly pine on C sequestration will essentially contribute to determine environmental and economic sustainability for wider geographical areas in south-east states of the United States.

Keywords: Agroforestry, Carbon sequestration, Switchgrass (Panicum vigratum L.), loblolly pine

GR-P 30

Phylogenetic diversity and biocontrol potential of endophytic fungi associated with Cornus florida L.

Endophytic fungi isolated from Cornus florida L. were analyzed for their diversity and antimicrobial properties against plant pathogens Macrophomina phaseolina, Sclerotium rolfsii, and Phytophthora capsic in vitro . A total of 379 endophytic fungi were isolated from 1050 tissue segments of 70 stem samples. Molecular identification of fungi were based on internal transcribed spacer rDNA sequence analysis. All isolates belonged to species of phyla Ascomycota and Basidiomycota, distributed over 5 orders and 11 genera including Xylariales (Hypoxylon, Whalleya, Nemania, Pestalotiopsis, Discotroma, and Xylaria), Diaporthales (Diaporthe and Cytospora), Trichosphaeriales (Nigrospora), Glomerellales (Colletotrichum) and Xylomelasma. Clustering analysis of isolated fungi was carried out using MEGA 7 software. The isolates belonging to same family clustered together in the phylogenetic tree. Out of the organisms that reside in dogwood tissue without causing symptoms, Hypoxylon sp., Diaporthe, Cytospora, Colletotrichum sp. and Pestalotiopsis have been reported as plant pathogens associated with cankers, and dieback diseases. Some of these isolates displayed biocontrol activity against major plant pathogens invitro. Hence, this study have systematically demonstrated the diversity, phylogeny and antagonistic activities of endophytic fungi isolated from C. florida.

GR-P 31

Analysis and Valuation of Ecosystem Services Provided by Urban Trees in Centennial Park, Nashville, TN

Analysis and Valuation of Ecosystem Services Provided by Urban Trees in Centennial Park, Nashville, TN

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Abstract

Growing urban population and scientific city planning is a unique feature of the 21st century. Urban trees play a greater role in the general wellbeing of the urban population through their influence on thermal comfort, energy use, and air quality by providing shade, transpiring moisture, and reducing wind speeds. This research seeks to evaluate the ecosystem services of tree in Centennial Park and discuss the tree benefits in light of the urban setting ecological framework. Data on tree species and their conditions were collected via complete inventory from geocoded 1322 trees in Centennial Park. These field data, along with the local hourly air pollution and meteorological data were used to quantify forest structure, environmental effects, and estimate the value of trees to communities. The i-Tree Eco 6 model was developed by the U.S. Forest Service, Northern Research. With a total tree cover of 17.34 acres and structural values of $2.61 million tons, the results show that, the trees in Centennial Park remove 851.3 pounds/year ($1.56 thousand/year) of pollution, store 788.8 tons ($102 thousand worth) carbon, produce 45.96 tons/year oxygen, avoid 36.51 thousand cubic feet/year ($2.44 thousand/year) of risk of runoff. The information gathered at the locations will contribute to the body of knowledge of tree benefits in urban settings.

Keywords: Centennial Park, Urban Trees, Ecosystem Services, i-Tree Eco Model, National Tree Benefit Calculator Model, GIS- Geospatial Information Systems

GR-P 32

Systematic review of the functionality and efficiency of bionic prosthetics for trans-tibial amputees based on mechanical interface, biomechanical dynamics, and neuroelectric components

Background: Transtibial prosthetic designs have evolved over time with ankle components initially being rigid and static. Flexible components and now bionic components are available. Prosthetic ankle components vary in their ability to mimic a biological limb especially in regards to metabolic energy and in gait efficiency. Purpose: The purpose of this review was three-fold: first to evaluate the strength and quality of the current research evidence on the use of powered plantar prosthetics, second, to determine whether current evidence regarding the use of bionic prosthetics should be considered when making decisions regarding functionality and efficiency of gait; and third, to identify weaknesses in the current evidence and area for continued research. Design: Systematic Review Methods: A literature search was performed on databases including: IEEE Xplore, Science Direct, IOP Science, PLOS one, Google scholar, Wiley, EBSCO Host, and PubMed. Articles selected for review were those of original research since 2003 and were evaluated for quality using the Oxford Centre for Evidence-Based Medicine 2011 levels of evidence system. Results: A total of 20 sources were reviewed for this study. Articles examined the current practices for preventing gait abnormalities based on prosthetic design, the biomechanics of healthy lower extremities, the biomechanics of prosthetic gait, and gait speed and efficiency. Conclusions: Three bionic designs emerged: intrinsic powered plantar flexion, EMG regulated plantar flexion and a combination integrating both intrinsic algorithms and EMG regulation to control the prosthetic. Of the three types of designs, evidence suggests the intrinsic algorithms with EMG extrinsic regulation is the most functional and efficient for transtibial prosthetic gait. Implications: Individuals with trans-tibial amputations that use powered plantar prosthetics are more functional and efficient in ambulation than passive prosthetics. Funding: No funding sources

GR-P 33

The Correlation Between Episiotomy and Postnatal Urinary Incontinence

The Correlation Between Episiotomy and Postnatal Urinary Incontinence: A Systematic Review

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The International Continence Society defines urinary incontinence (UI) as the involuntary loss of urine. An estimated 57% of women experience some form of UI between the ages of 35-74, while an 6-43% occurrence is reported in postpartum vaginal deliveries. Episiotomy is a prevalent procedure with vaginal births due its consideration as preventative care of pelvic floor musculature (PFM). However, several recent studies have challenged the effectiveness of episiotomy in preserving PFM stability and function, using urinary incontinence (UI) as an outcome measure. A systematic review compiling recent research to summarize the relationship between episiotomy and UI does not yet exist. Therefore, this study questioned whether mothers with episiotomy will have higher occurrences of postpartum UI than women without episiotomy. The systematic review was conducted from Cochrane Review, Google Scholar, Journal of Womenâ€™s Health Physical Therapy, and PubMed, using keywords â€œEpisiotomy AND Urinary Incontinenceâ€ and â€œEpisiotomy AND Pelvic Floor Dysfunctionâ€ . Original research within the last 20 years involving any grade of episiotomy and number of births were included. Thirty-three articles qualified with outcomes split overall evenly in positive and negative correlations between the two factors. It was concluded that, based on current available research, the relationship between episiotomy and UI is inconclusive.

GR-P 34

An Examination of Virtual Reality Interventions as a Resource for the Treatment of Phantom Limb Pain

Virtual reality is a new and developing technique entering the medical community that may be effective in relieving pain. A specific type of pain termed phantom limb pain (PLP), is the occurrence of pain in an area that has been amputated and is reported to affect more than 50% of patients with amputations. Currently, the treatment of phantom limb pain is highly variable in the strategies used and their effectiveness. Based on the theory of maladaptive cortical reorganization causing PLP, we hypothesized that the use of a virtual reality intervention would elicit a reduction in PLP. Using the Oxford Centre of Evidence-based Medicine (OCEBM) classification, a systematic review of the literature, was conducted to determine the pathophysiological mechanisms contributing to PLP and how virtual reality techniques could beneficially impact cortical reorganization. Based on OCEBM, the majority of the articles reviewed were level 2 evidence and supported virtual reality as a resource for alleviating PLP. We concluded that the available evidence supports that the use of virtual reality could be an alternative treatment for PLP and could decrease PLP.

GR-P 35

Evaluation of Triclosan Exposures on Interleukin 6 and Interleukin 1 Beta Secretion from Human Immune Cells

Triclosan (TCS) is an antimicrobial compound that is widely used in personal hygiene products such as mouthwash and toothpaste. TCS can be ingested or absorbed through the skin and has been found in human blood, breast milk, and urine. Interleukin (IL)-6 and IL-1 beta (IL-1Î²) are important pro-inflammatory cytokines produced by lymphocytes, monocytes, and other cells. Both regulate cell growth, tissue repair, and immune function, increased levels of each have been associated with a number of diseases including rheumatoid arthritis and certain cancers. TCS has been shown to inhibit the lytic function of human natural killer (NK) lymphocytes and to decrease expression of key cell surface proteins on NK cells. Here we examine whether TCS alters the secretion of IL-1Î² and IL-6 from human immune cell preparations. Human peripheral blood mononuclear cells (PBMCs) and monocyte-depleted (MD)-PBMCs were exposed to TCS at concentrations of 0-5 ÂµM. Cytokine secretion was measured at 24 h, 48 h, and 6 days using enzyme-linked immunosorbent assay (ELISA). Both IL-1Î² and IL-6 secretion were increased at one or more concentration of TCS at one or more length of exposure. These results indicate that TCS has the capacity to disrupt secretion of these two important pro-inflammatory cytokines.Supported by NIH grant U54CA163066

GR-P 36

Influence of Post-Traumatic Stress Disorder and Depression on the Quality of Life of Veterans with Traumatic Lower Extremity Amputations

INTRODUCTION

Physical Therapists utilize Quality of Life (QOL) scores to quantitatively measure how patients perceive their own QOL throughout the rehabilitation process. QOL is not only affected by physical health, but also mental health. PTSD and depression have been shown to have a notable presence among in Veteran populations. As Veterans with lower extremity (LE) amputations are a growing subgroup within the veteran population, this study looked to investigate how the diagnoses of PTSD and depression in Veterans with a traumatic LE amputation affected their QOL.

METHODS

A systematic review of multiple databases was performed using the keywords Veterans, lower extremity amputation, PTSD, Depression, and QOL to cultivate information related to our research topic. Twelve articles were identified that met our inclusion and exclusion criteria.

RESULTS

QOL scores for veterans with lower extremity amputations were shown to be moderately decreased for those with a diagnosis of PTSD or depression. Traumatic amputation in itself did not directly correlate to a decreased QOL. Additional factors, such as the number of amputations an individual has and/or their level of amputation, did not show a strong correlation with a decreased level of QOL for this population.

CONCLUSION

Self-reported QOL values indicated that amputation status, with or without non-mental health related comorbidities, does not directly result in decreased QOL. Although amputation status alone did not provide a direct correlation to QOL values, depression and PTSD were found to negatively impact the Physical Component Summary (PCS) in QOL scores. PTSD and depression are highly prevalent in veterans with lower extremity amputations, resulting in a moderately viable predictor of QOL scoring for this population.

SOURCES OF FINANCIAL SUPPORT

None

GR-P 37

The Effectiveness of Extracorporeal Shockwave Therapy on Athletes with Medial Tibial Stress Syndrome: A Review of the Evidence

The purpose of this evidence review is to determine if extracorporeal shockwave therapy could be an effective treatment option for athletes with medial tibial stress syndrome (MTSS). MTSS is a common diagnosis among athletes who increase training duration or intensity too quickly or may result from a change in running surface, style or footwear. MTSS is described as pain or tenderness along the distal 2/3 of the posteromedial tibia spanning an area of at least 5 cm. Risk factors include: female gender, high body mass index (BMI), higher navicular drop, previous lower extremity injury, and increased external hip rotation with hip in flexion. It is also associated with decreased bone density. Extracorporeal shockwave therapy (ESWT) is a noninvasive modality used for the treatment of pain and healing. ESWT is effective in alleviating pain in plantar fasciitis, healing fractures of long bones, healing of superficial tendinosis, and increasing bone density. Studies supporting the effects of ESWT to increase blood flow show a promising future of the use of ESWT to stimulate bone marrow and periosteal edema in order to speed up the recovery of MTSS. Treatment with ESWT in combination with a home exercise program consisting of stretching and strengthening has been found to result in reduction of pain and degree of recovery when compared to stretching and strengthening alone. Similarly, incorporating ESWT with a grading running program has been shown to accelerate return to sport when compared to only using a graded running program. More research is needed on the mechanism of biological changes resulting from MTSS, as well as the physiological effects caused by ESWT in order to determine if ESWT would be a viable treatment option for MTSS. Further randomized control trials looking at the outcomes of ESWT on MTSS are also needed.

GR-P 38

Classical Music and its Effect on Memory and Cognitive Function

The purpose of this research study is to determine if classical music has an effect on memory and cognitive function. A randomized generator will provide each participant with a four digit code to aid in keeping each subjectâ€™s identity anonymous. The research study will be conducted in a private classroom in Clement Hall. Participants will be asked to participate in two memory recall sessions, one with a classical musical stimulus and one with no musical stimuli. Each session will take approximately 5-10 minutes. The classical music stimulus session will have Mozartâ€™s Symphony #7 playing in the background while the participant is memorizing and recalling the list of words provided by the investigators. In each session, a randomized list of 60 words will be provided for the subject to study and write down the recalled items after a two minute time limit. The investigators hypothesize that the classical music will have a positive effect on memory recall versus a quiet environment.

GR-P 39

Mindfulness-based Stress Management Training and Its Effects on Factory Workersâ€™ Well-being

It is almost impossible to mention work without the word â€œstressâ€ appearing in the same conversation. While previous research supports the stress reducing benefits of mindfulness training in health professionals and other white collar workers, more research is needed to examine the potential benefits and participation willingness for other industrial populations such as factory workers. The purpose of our study is to determine if participation in a workplace mindfulness-based stress reduction training program will lead to an increase in factory workersâ€™ levels of mindfulness and a decrease in stress levels. Participants will attend group mindfulness sessions at work one day per week for six weeks during the lunch break. During the sessions, participants will learn and practice strategies to increase mindfulness. They will also listen to mindfulness meditations during the group session. Participants will complete two short questionnaires before and after the six week study to compare their levels of perceived stress and mindfulness before and after completing the mindfulness training program. We predict that there will be an increase in mindfulness and a decrease in stress levels reported on the questionnaires after completing the training.

GR-P 40

The Effects of Occupational Therapy Intervention Relating to Self-Efficacy with Formerly Homeless Individuals in Supported Housing

The Effects of Occupational Therapy Intervention Relating to Self-Efficacy with Formerly Homeless Individuals in Supported Housing completed by Tennessee State University occupational therapy students aims to delve into how the experience of homelessness can affect feelings of self-efficacy. Homelessness not only affects someoneâ€™s life when it comes to not having a stable place to call home, but it also affects mental health and occupational functioning. The Tiny Home Project at Green St. Church in Nashville, Tennessee has created a camp with 12 houses and 3 tents that gives those experiencing homelessness a place to rest their heads, while spending the day working or looking for a job. As these individuals begin to get back on their feet, there may be feelings of nervousness and uncertainty. This study aims to discover if occupational therapy would be beneficial for these individuals. A total of five sessions were carried out, a pre- and post-test and three specific occupational therapy interventions. The Canadian Occupational Performance Measure (COPM) was utilized to measure self-efficacy before and after occupational therapy interventions. Money management, stress management, and vocational and leisure exploration were covered over the course of this study with specific content related to what each participant was interested in learning. We hypothesized that covering these topics may yield more positive feelings of self efficacy, and more confidence as the participants transition into a more permanent housing situation.

GR-P 41

The Influence of Weighted Items on Challenging Behaviors in Adults with Developmental Disabilities

The purpose of the study, The Influence of Weighted Items on Challenging Behaviors in Adults with Developmental Disabilities, is to identify whether or not sensory self-regulation/integration techniques, that are popular with children, will decrease challenging behaviors in adults with developmental disabilities and autistic behaviors. Participants were recruited from BrightStone work-based day program located in Franklin, TN, and have been diagnosed with various intellectual and developmental disabilities. These participants exhibit behaviors that distract from their participation as a student at BrightStone. For the purpose of this study, challenging behaviors are categorized as repetitive body movements, self-injurious/dangerous behavior, auditory/verbal self-stimulation, and atypical social and communication skills. Each participant was observed during two, 1-hour sessions to determine a baseline for challenging behaviors. Following observation, the application of weighted items fell into two randomly assigned protocols. One group received a weighted vest while the other group received a weighted lap cover, each for 15 minutes. Each group was observed for one hour in total so that behaviors post-application were documented. The following week, the protocol was reversed and each participant received the other form of weighted item and subsequent observation. Through this study, we expect to find that weighted interventions will promote self-regulation and diminish impact of challenging behaviors affecting occupational performance.

GR-P 42

Short-Term Memory Recall:The Effectiveness of Handwritten Repetition Compared to Verbal Repetition

This research project is to investigate if verbal repetition or written repetition methods from word lists yield a higher number of recalled words based upon four short-term recall trials. The word lists contain randomized words varying in length. The study contains a preferred learning type pre-assessment (auditory, visual, etc.) to assess if a correlation exists between learning types and the results of the trials conducted between verbal and written repetition strategies. The investigators intend the data of this research to yield the following result: handwritten repetition will be a more effective method for short-term memory recall than verbal repetition.

GR-P 43

The Behavioral Effects of Personalized Music Therapy on Levels of Alertness, Interaction and Mood in Long-term Care Patients

As the population ages, the number of people with Alzheimerâ€™s and other dementias will continue to increase; therefore, the more research and progress that can be done and made will allow for lower costs of caring for Alzheimerâ€™s patients and higher quality care. Various studies have been done to evaluate the effectiveness of general music therapy on behavioral and psychological symptoms of dementia, and the majority of these studies report positive results on symptoms. Music therapy involving listening to preferred music has been studied to a lesser degree. This research will study the effects of the Music and Memory program on 5-18 subjects with dementia living at Mary, Queen of Angels Assisted Living in Nashville, TN. The subjectsâ€™ levels of alertness, interaction with others, and mood will be observed before, during, and after participation in the Music and Memory program to determine the immediate impact of listening to preferred music. Because other studies have shown that individuals with dementia react positively to listening to general music selections, we expect that our subjects will show positive behaviors as a result of listening to preferred music.

GR-P 44

Nature-based Therapeutic Media

Problem and Purpose. Many types of therapeutic media seem foreign or unfamiliar to patients in rehabilitation due to highly specified and utilitarian design characteristics. This can be overwhelming or off-putting for patients causing them to have a low self-efficacy about interacting with therapeutic media successfully. It is hypothesized that a therapeutic task involving nature-based media will improve mood leading to higher perceived self-efficacy and better compliance over traditional therapeutic media.

Methods: Three separate groups of participants will complete three separate tasks that mimic a therapeutic exercise. Subjects will be adults of any sex, aged 50 or over who are legally independent (have no legal guardian) and who have full upper extremity function. The first task will involve interacting with live natural media in the form of plants. The second will involve interacting with pictures of nature. The third will involve interacting with traditional media that is non-natural.

Results: The expected results will show that interacting with pictured or live natural media will provide patients with a higher sense of self efficacy and thereby increase their willingness to complete rehabilitation tasks that involve nature-based media over traditional media.

GR-P 45

The Effects of Low-Intensity Isokinetic Training Using Blood Flow Restriction Protocol to Reduce Recovery Time in Individuals with Achilles Tendinopathy

Objective: To investigate the physiological and biochemical effects of blood flow restriction (BFR) exercise on muscles and tendons to determine its potential implications for those with Achilles tendinopathy.

Design: Systematic review

Background: It has been documented that BFR promotes improvements in muscle strength and hypertrophy after bouts of low-intensity exercise (20-40% 1RM) by simulating high-intensity training (70% 1RM) through occluding venous blood flow from the limb with a pressurized cuff. This effect is elicited by the bodyâ€™s inflammatory and protective responses to the increased metabolic demand. Although these effects are well established, the exact chemical mediators and their intimate relationship are still unclear and documented effects of BFR on tendon mechanobiology alone are scarce. The healing timeline of lower extremity tendinous injuries can be prolonged if external stimuli are not strong enough to elicit adaptational responses. Correspondingly, those with Achilles' tendinopathy injuries are often limited in the amount of external input due to weight bearing and exercise restrictions. BFR allows one to exercise at intensities low enough to protect healing tissues while maintaining high-intensity stimuli to increase adaptational responses potentially decreasing overall time in rehab.

Methods: Evidence review (Level 1 and 2).

Results: This review incorporates 23 Randomized Control Trials (RCTs) and 9 Systematic Reviews (SRs).

Conclusion: The present systematic review provides evidence on the benefit of blood flow restriction on muscle and tendon repair. The data leads us to believe that an Achillesâ€™ tendinopathy would benefit from BFR exercise. Future research needs to be focused on the long term safety of such application.

GR-P 46

Case Report of a Pediatric Patient with GNB1 Disorder

Case Report of a Pediatric Patient with GNB1 Disorder

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Abstract

Background and Purpose. GNB1 disorder is a rare genetic condition caused by mutation on the gene encoding the guanine nucleotide-binding protein subunit beta-1, resulting in alterations of the transmembrane signaling systems of that particular gene. The mutation of the GNB1 gene was previously identified in cancer but has recently been linked to neurodevelopmental disorders. The purpose of this case report is to detail interventions, evaluative methods, and diagnostic tools in order to provide a comprehensive physical therapy plan of care to patients with this rare genetic condition.

Summary of Key Points. The patient, a 2-year-old female, was diagnosed with GNB1 genetic disorder, a condition characterized by abnormal muscle tone, developmental delay, seizures, and visual impairment. A physical therapy examination and evaluation administered at 7 months of age revealed generalized muscle weakness and delayed milestones. The patient progressively attained her goals, but remained delayed in age equivalent gross motor milestones. Suggested pathway is to continue to modify plan of care pursuant with changes in patientâ€™s condition to progress toward higher level gross motor skills.

Recommendations for Clinical Practice. For patients with a diagnosis of GNB1 genetic disorder who present with significant hypotonia, physical therapy is an integral component of advancing a childâ€™s progress toward age-equivalent milestones. In addition to physical therapy, integration of occupational therapy, feeding therapy, speech therapy, and attainment of equipment, such as a Sensory Dynamic Orthosis (SDO) and ankle-foot orthoses (AFOs), may be necessary to provide a comprehensive treatment approach to maximize the patientâ€™s success.

No funding sources were utilized.

GR-P 47

Assessing the Language Production of Preschool Children-An exploration of Dynamic Assessment and Dialogic Reading

There has been much debate on the best way to assess culturally and linguistically diverse populations. Many studies suggest that static or standardized assessments are subject to cultural and linguistic bias. As a result, researchers have attempted to investigate other modes of assessment. Dynamic Assessment is an assessment process in which a â€œTest-Teach-Retestâ€ format is used. This assessment procedure not only examines what a child knows, but examines what the child has the capacity to learn. It has been found to be an appropriate and useful measure, particularly when assessing culturally and linguistically diverse populations. The â€œteachâ€ portion of the Dynamic Assessment paradigm consists of a Mediated Learning Experience (MLE), which is a period of providing guided instruction in a particular area. Dialogic Book Reading (Lonigan & Whitehurst, 1998) is an interactive method of reading that has been found to be an effective way to improve the oral language skills of preschoolers. The purpose of this study is to examine the impact of Dialogic Reading and Dynamic Assessment (test-teach-retest) on narrative production in preschool children. Language production skills will be measured using two analyses: Mean Length Utterance (MLU) and Incidental Word Learning (target word production). This study further aims to investigate the relationship between static and dynamic assessment results. The following questions will be answered:

Is there a significant difference between pre and post MLU scores?

Is there a significant difference between pre and post target word production?

Is there a significant difference between standardized test performance and incidental word learning?

GR-P 48

Effectiveness of mobilizations versus manipulations on improving spinal disability

Effectiveness of spine mobilizations versus manipulations on improving spine disability.

Kevin Lawrence, PT, DHS, OCS; Zach Berry, SPT; Michael Carter, MS, SPT; Caleb Nobles, SPT

Intro

Neck and low-back pain are common disorders in the general adult population. The clinical question, which is comparing the effectiveness of mobilizations versus manipulations on spinal outcomes, is yielded from a review of literature on regarding the topic. Evidence from research on spinal manipulations versus mobilisations, as independent therapies for spinal disorders, is lacking. We wanted to compare how mobilizations and manipulations to the spine affect neck and low-back pain.

Methods

The PubMed, Google Scholar and EBSCOhost databases were searched with the following key words: manipulation, mobilization, oswestry, roland-morris, thrust, and high-velocity. The articles found and included were ranked according to a set criteria as strong, moderate or weak evidence.

Conclusion

There is evidence that both mobilizations and manipulations of the spine are effective at treating spine disability. There are is no conclusive evidence that manipulation or mobilization at one or multiple locations on the spine are significantly more effective than others.

GR-P 49

Host range study of a lysogenic phage in a roseophage-roseobacter system and characterization of lysogens in affecting marine biogeochemistry

University of Tennessee, Knoxville

Department of Microbiology

Viruses are abundant in the marine environment, where they actively infect marine bacteria and contribute to biogeochemical cycles. Bacterial viruses (phage) display two distinct lifestyles: host lysis or integration in their hostâ€™s genome (where they are termed prophage). Prophages lie dormant until environmental conditions trigger their induction to a lytic cycle. In a limited number of well-studied phage-host systems, prophages have been able to provide their hosts immunity against infection by other phage. The extent to which this immunity is prevalent in marine bacteria and influences the occurrence of lytic events has not been well studied. We have isolated a marine bacterium, Sulfitobacter sp. CB2047, and its infecting phage (Ï•CB2047-A). The bacterium contains a prophage with high sequence similarity (85.65% identity) to Ï•CB2047-A. We have also isolated four additional Sulfitobacter strains, isolated from distinct environments and none of which contain a prophage. Integration experiments of Sulfitobacter CB2047 with Ï•CB2047-A results in a substitution of the prophage, yield the strain YM3A. We hypothesize that phage integration is possible in the additional Sulfitobacter strains and have data to support this for Sulfitobacter sp. EE-36. These data increase our understanding of the biotic factors that stimulate prophage integration. We also hypothesize that prophage in their lysogenic state will affect host physiology. Indeed CB2047 and YM3A have distinctly different phenotypes with respect to growth rates, cell size, and biofilm formation, suggesting that roseophage have the ability to dramatically alter bacterial physiology and marine biogeochemistry.

GR-P 50

Quantitative In Vivo Imaging Approaches For Measuring Precursor Targeting to Plastids

University of Tennessee

Dept of Biochemistry & Cellular & Molecular Biology

Plastids, such as chloroplasts, have one of the most complex systems of protein sorting, consisting of translocons and selective machinery that mediate proteins from the cytosol to the proper location within the organelle. Though plastids have a genome of their own, the majority of localized proteins are nuclear encoded and must be post-translationally imported. They do this through a transit peptide â€œzip code,â€ a targeting sequence specific to the directed localization of the specific protein. Recently, qualitative progress has been made using chimeric fluorescent proteins with the transit peptide for the small subunit of RuBisCO fused variants of the green fluorescent protein (GFP). We have made this assay quantitative by using YFP targeting to leucoplasts in onion epidermis following biolistic transformation. Although this assay is quite quantitative it suffers from several limitations: 1) it uses non-green plastids for looking at targeting of photosynthetic proteins, 2) onion is a monocot and most constructs are from dicots, and 3) the efficiencies are too low to allow any further biochemical analysis such as plastid isolation. To overcome these limitations, we have begun using rapidly growing pea (Pisum sativum) seedlings as a source for in vivo analysis. We are now comparing three quantitative in vivo approaches to test various transit peptide site-specific mutations: PEG mediated transfection of protoplasts, and both Agrobacterium mediated and Biolistic transformations of leaves. Following PEG mediated transfection, the intact chloroplasts can be isolated and evaluated quantitatively for protein translocation using confocal microscopy, flow cytometry, and/or immunoblotting. Import and processing can be confirmed using exogenous treatment of the protease thermolysin on the intact chloroplasts. The various advantages and disadvantages of the three methods are presented here.

GR-P 51

Is reduced apical height of conical petal cells a new trait in the selfing syndrome?

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Department of Ecology and Evolutionary Biology

A novel function of a floral trait, the presence of conical petal cells (CPC), has been identified in Antirrhinum. In a set a behavioral assays, it was determined that bees that visit wild type Antirrhinum flowers (wild type CPC expression) have increased foraging success relative to bees that visit mutant flowers that lack CPC expression (flat epidermal cells). Bees on flowers with CPCs retain a grip on the petals of large, showy, zygomorphic flowers, which facilitates outcross pollination. On petals with only flat epidermal cells, bees are unable to maintain their grip on flowers, which reduces outcross reproductive success. CPCs have been documented in ~80% of angiosperm taxa examined, yet little is known about differences in surface abundance CPCs or morphology between plant species with predominantly outcrossing vs. selfing mating systems. We hypothesize that highly self-fertilizing species will have significant reductions in the relative petal area covered by CPC and apical height of cells compared to outcrossing species. We test this hypothesis by quantifying the percent petal area covered by CPC and the apical height of individual petal cells using scanning electron microscope (SEM). We contrast these metrics in two selfing/outcrossing sister species pairs in the genus Collinsia (Plantaginaceae) [C. rattanii /C. linearis and C. parryi/C. concolor]. Our results show that the selfing species have a reduced percent area of CPCs and nearly exclusively flat petal cells compared to their outcrossing sister species. These results suggest that reduced CPCs may be an additional trait in the selfing syndrome.

GR-P 52

Growth Effects of Tumorigenic Cells Exposed to Extracts of The Medicinal Plant Onosma

Growth Effects of Tumorigenic Cells Exposed to Extracts of The Medicinal Plant Onosma. Jawaher Albaqami and E. Lewis Myles

Cancer informed benign tumor or malignant neoplasm. It is also considered as a group of disease that abnormal growth of the cells with the potential to spread and invade other parts of the human body. This examination concentrates fundamentally on Onosma has been customarily utilized and consider has demonstrated their significant antibacterial, antimicrobial, and against parasitical exercises. It is noted that Tobacco use is the leading cause of about 30% of cancer deaths in the world. Another 20% is due to obesity, poor diet, consumption of alcohol and lack of physical activity. About 10-20% of cancer is because of genetic problems inherited from one individual to the other. These vital attributes give the reason for examining Onosma and concentrates further for potential antitumor specialists. However, Concentrates were taken from the already expressed plants and presented to cancer cells for 24 hours. Development examination was then decided to utilize a cell viability indicator Alamar. At its most elevated concentration, cell growth was just about 5 percent at a certain point, an outcome not noticeable in different plants. Nonetheless, the slightest viable plant gives off an impression of being Onosma, in which cell development was averagely higher than all plants even at its most astounding concentrations. In all cases, this concentrate demonstrated practically no impact in diminishing cell expansion. Then again Onosma had some influence on COLO320, PC3, SW620 and A549 however just at the most astounding concentration of 0.01mg/ml.

Biased on the result, it is presumed that extracts from Onosma ought to be concentrated further to describe their antitumor potential, research their original dynamic mixes, and to comprehend better their components of activity.

GR-P 53

Cytotoxicity Activities of Lemon balm, Wormwood, Costus, Guava leaves Plant Extracts and Honey against Breast/Lung /Colon Cancer Cell Lines.

Cytotoxicity Activities of Lemon balm, Wormwood, Costus, Guava leaves Plant Extracts and Honey against Breast/Lung /Colon Cancer Cell Lines. Heba Alhamdi and Chris Davis, E. Lewis Myles

The National Cancer Institute states that the overall number of Americans with cancer diseases is approximately 13.7 million people. The U.S. cancer mortality rate is currently 580,350 Americans per year and 1,600 per day, according to 2013 statistics. Furthermore, cancer is the second most widespread cause of death in the United States, exceeded by heart disease. Cancer covers approximately 20 percent or one-fifth of all death causes in the U.S. This investigation focuses primarily on Costus speciosus , Psidium guajava, Melissa officinalis, Artimisia, and honey. These important characteristics provide the rationale behind studying these plants and extracts further for potential antitumor agents.

Experimental: extracts were taken from the previously stated plants and exposed to breast, lung and colorectal cancer cells for 24 hours. Growth analysis was then determined using a cell viability indicator Alamar blue and a florescent plate reader.

Results: Psidium guajava appears to be the most effective plant when it comes to inhibiting cancer cell growth, followed by Melissa officinalis. At its highest concentration, cell growth was almost zero at one point, a result not visible in other plants. However, The least effective plant appears to be Costus speciosus, in which cell growth was averagely higher than all plants even at its highest concentrations. In all cases, this extract showed little or no effect in reducing cellular proliferation.

Conclusion: We conclude that leaf extracts from Psidium guajava and Melissa officinalis and Honeybee should be studied further to characterize their antitumor potential, investigate their main active compounds, and to better understand their mechanisms of action.

GR-P 54

A novel process of arachidonic acid ester by the cross-coupling of arachidonic acid organo halides in the presence of Pd-Catalyst

In response to receptor-dependent as well as receptor-independent stimulation in various cells, endogenous arachidonic acid is released from cell membranes and is converted to prostaglandins by cyclooxygenase metabolites. We are working on to synthesizing arachidonic acid ester by cross-coupling of arachidonic acid and organo halides in the presence of palladium-catalyst. Our goal is to examine the significant biological effect of these arachidonic acid esters and anandamide derivatives. In this work we outline the synthesis process of the esters and amides. Initial study is promising. This reaction process and mechanism will be displayed.

GR-P 55

Palladium-catalyzed cross-coupling reaction of potassium alylBF3K and amines

Amine containing compounds have been important in pharmaceutical and organic chemistry due to their functional group properties. Allylated amines serve as building block for other pharmaceutical drugs. Due to the delocalized electrons of double bond on allyl moiety, allyl moiety is a highly reactive nucleophile. It can undergo radical reaction, polymerization, or other possible unintended side reactions. Potassium allyltrifluoroborate is a great media to transfer allyl moiety into target compounds. In this work we design a cross-coupling reaction of amine with potassium allyltrifluoroborate. Potassium allyltrifluoroborate (AllylBF3K) is a white crystal, robust, and more stable allyl boron compound compared to allyl boronic acid and allyl boronic ester. We have made a remarkable progress in cross-coupling between AllylBF3K and amine in the presence of palladium catalyst. These results are presented.

GR-P 56

The Difference in Traumatic Brain Injury in Sham mice and Traumatic Brain Injury

Have you ever wondered what happens when football players and boxers get knocked out? Have you ever wondered how the brain was being affected? Or if it was causing traumatic brain injury (TBI)? While working in the lab we induced traumatic brain injury(TBI) in mice resulting in a concussion. The main purpose of the project was to run various behavioral tests, then analyze the data to determine if there was a difference between the mice that received concussions and the mice that did not. We ran behavioral tests such as the elevated plus maze which test risk taking behavior, the Morris water maze to test cognitive memory, and the t maze to test spatial cognitive memory. We found significant differences in the t maze. Data analysis will continue to be performed for these measures.

UG-P 19

Pentachlorophenol Effects Synthesis of IL-1Î² in Human Immune Cells

Pentachlorophenol (PCP) is an environmental contaminant found in human blood. PCP has been used in fungicides, insecticides, herbicides, and antifouling paint. A number of cancers and diseases are associated with exposure to this contaminant. Interleukin 1-Î²eta (IL-1Î²) is a cytokine produced by lymphocytes and monocytes. It is involved in stimulating cell proliferation, tissue repair, and present during the inflammatory response to injury. Increased levels of IL-1 Î² have been associated with rheumatoid arthritis, systemic lupus erythematosus, psoriasis, ulcerative colitis, and tumor progression. A decrease in levels of IL-1 Î² could lead to lack of an appropriate immune response to a pathogen while elevations in its levels may lead to increased potential for inflammatory disorders and tumors. Previous studies in our lab show that PCP increases secretion of IL1Î² from peripheral blood mononuclear cells (PBMCS) and monocyte-depleted PBMCS. Increased secretion could be due to PCP-induced release of a store of pre-existing cytokine in these cells or due to PCP-induced increases in the synthesis of IL-1Î². The objective of this study was to examine if exposure of human immune cells to PCP increases the synthesis (secreted + intracellular levels) of IL1Î². PBMCS were exposed to 5 ÂµM to 0.05 ÂµM PCP for 10 min, 1 h, 6 h, and 24 h. PBMCs showed increased synthesis of IL1Î² after 6 h and 24 h exposures to PCP. The concentrations of PCP at which these increases occurred varied among the donors. These results suggest that PCP-induces synthesis of IL1-Î² which may have the potential to cause immune system dysregulation. Supported by NIH grant U54CA163066.

UG-P 1

What are the Impact of Access Management Practices to Pedestrian Safety?

This study focused on the impact of access management practices to the safety of pedestrians. Some of the access management practices considered to impact pedestrian safety included limiting direct access to and from major streets, locating signals, limiting the number of conflict points and separating conflict areas, removing turning vehicles from through traffic lanes, using nontraversable medians to manage left-turn movements and providing a supporting street and circulation system. The study evaluated through statistical modeling the correlation between access management practices to pedestrian crashes. Focused on the impacts of access management on pedestrian crashes, eight major roadway corridors were selected and utilized for analysis. Utilizing Negative Binomial, the correlation between roadway features and pedestrian crashes were modeled. Four variables including AADT, access density, percentage of trucks and the presence of TWLT were found to be positively associated with the pedestrian crash frequency. Variables such as the presence of median, presence of crosswalk, presence of shoulders, presence of sidewalk and high speed limit had negative coefficients hence their increase or presence tends to decrease pedestrian crashes. It could therefore be concluded that though these variables had some influence on the pedestrian crashes, access density, crosswalk, sidewalk and speed limit were the most statistically significant variables that determined the frequency of the pedestrian crashes.

UG-P 2

Developing Crash Modification Factors for Median Cable Barriers in Tennessee

This paper developed Crash Modification Factors (CMF) for median cable barriers in Tennessee. Utilizing cable barriers installed from 2006 to 2010, the study used comparison group approach that considers crashes before and after the installation of cable barriers. Comparison segments were selected if they met criteria such as median width equal to the median width of the existing cable barrier segment plus or minus 10 feet, the segment length is equal to the cable barrier segment plus or minus 20 feet and the AADT is equal to that of the cable barrier segment plus or minus 1000 vpd. Using comparison group and screened median-related crashes only, CMF for fatal crashes was found to be 0.04, fatal and incapacitating injury 0.07, and 0.14 for fatal and all injury crashes combined.. These CMFs which translate into crash reduction percentages of 96% and 86% for fatal and fatal and all injuries combined respectively are comparable or slightly better compared to those obtained from other states. However, when all crashes within the cable segment were used (without screening median related), the CMF for fatal was found to be 0.46, and 1.18 for all crashes. This implies that installation of cable barriers in Tennessee significantly reduces fatal and severe injury crashes but increase minor PDO crashes (mainly those below $400). The developed CMFs responds to the intended benefits of the median cable barriers to prevent cross-median crashes which occurs when a vehicle leaves its travel way enters or crosses the median dividing the highway directional lanes and collides with vehicles in the opposite direction.

UG-P 3

University Campus Evacuation Challenges: Microsimulation approach

This paper attempts to simulate different and possible challenges which my face campus-like emergence evacuations. Using the Tennessee State University (TSU) campus located in Nashville as a case study, a VISSIM based emergency evacuation simulation analysis was conducted. Different evacuation strategies and scenarios were simulated under various transportation infrastructures within the campus, including varied evacuation time, parking lot locations and utilization levels, main (signalized) and minor (unsignalized) intersections surrounding the campus. The simulation results, including network and intersection performances were analyzed under different evacuation scenarios in terms of number of vehicles evacuated, distance traveled, delay, speed, number of stops and level of service (LOS), the findings which are presented in this paper. It was found that the evacuation will be efficient only when the parking lots are 50% or less utilized but will fail beyond that level of occupancy. Considering different evacuation scenarios, full evacuation was achievable only after 80 minutes evacuation time. The challenges were observed on whether to utilize signalized or non-signalized access from the campus. Most of the signalized intersections performed at an undesired level of service with evacuation targeted at 15 minutes or 30 minutes, but improved to LOS D or better for evacuation targeted at 50 minutes to 80 minutes. Intersection delay evacuation model followed power function with a negative scaling factor. Though different campuses have different layouts and configurations, the study findings are assumed to align with problems which might be faced in other similar campuses especially those close to CBD areas as TSU.

UG-P 4

Design of Power Efficient Stirling Engine

Efficiency optimization of the Stirling Engine presents the opportunity for expanding the use of renewable energy resource. Improvements upon this technology are made through modern approaches to material selection and mechanical design. This study is to investigate analytically how this can be done inexpensively and effectively. The Stirling Engine is currently a small-scale solution to the global problem of disengaging our reliance on carbon-based fossil fuels. The engine cycle has been shown to reach upwards of forty percent of Carnot efficiency, if not greater in personal projects. There have been many improvements upon the original engine patent presented by Robert Stirling; including breakthroughs made by Ivo Kolin and Jame Senft, with designs of a hand-held version of the engine known as the â€œringbomâ€ configuration. The ringbom configuration offers up the opportunity to change design elements such that the operation nature of the engine (expansion of gas in a volume upon heat exertion) can be optimized in the smallest versions taking vantage of lower temperature differentials. The analytical method in this study utilizes programs/simulations compiled by renown Stirling enthusiasts whom based such programs off different mathematical models estimating power output and efficiency. Results are compared and collectively show that heat capacity of the working gas and regenerator mesh/material distinctively impact engine performance across models. The volume of the gas is a minimal factor in performance, if properly sealed along displacer with proper room to sweep between the two temperature reservoirs. Influence of conductive materials regarding this fact is being studied. Research is also being done to find out scaling factors and issues that may arise in increasing the surface area of the heat flux entering the system and potential losses. Scaling optimization is crucial for future work within this project in regards to application of energy harvesting in the na

UG-P 5

TSU Student Housing Study

Housing students on campus is a necessary part of student success but can be problematic and costly to the institution. This study attempts to evaluate the Tennessee State University student housing program and gather student perspectives pertaining to their experiences living in student housing. A mixed-methods design will be utilized. Responses will be collected through an online survey concerning studentsâ€™ experiences and attitudes with regards to their housing placement. PhotoVoice submissions will also be collected through email to capture student perceptions on the impact of dorm conditions. Additionally, the researchers will attempt to analyze the current budget allocated to student housing. The sampling method for this study will be purposive. Recruitment fliers containing the website address of the survey and PhotoVoice submission email account will be placed in every student residence facility according to TSU policy. The results of this study will report on student housing budget performance, univariate statistics describing the data set, bivariate comparisons of demographic factors, and selected PhotoVoice submissions that best represents other data collected. Conclusions will help identify ways Tennessee State University can improve student success, retention, graduation rates, and make its student housing program more efficient.

UG-P 6

The Inclusion of LGBTQ Students Attending an HBCU

It is important for LGBTQ students to feel comfortable if they are to be successful students. This project conducts program evaluation to assess LGBTQ student perceptions about how inclusive they feel the supports and services provided by Tennessee State University are in regards to helping them feel safe and supported. A convenience sample of 30-50 currently enrolled TSU students who identify as LGBTQ will participate in a brief survey that assesses their feelings about various factors related to inclusion. Findings will present univariate descriptions of the study sample, along with bivariate comparisons of responses by relevant demographic groups. Conclusions will identify best practices that TSU could implement in order to meet student needs, thus promoting retention, graduation, and overall student success for TSUâ€™s LGBTQ students.

UG-P 7

The Journey to Graduate: Behind the Scenes and the Experiences of Transfer Students to Tennessee State University and into The Social Work Program

This project uses the science of program evaluation to inform the development of improved techniques and processes governing the transfer process at Tennessee State University. It is imperative that TSU receives transfers students well who are finishing the free two years from a community college. This study is conducted in service to the Director of TSUâ€™s Social Work Program by Social Work students and focuses on better understanding the transfer experience for our program. Our sampling frame consists of students who transferred into TSUâ€™s Social Work program as early as Fall of 2015. Using a mixed methods approach, this project offers all 18 of these students an opportunity to complete an online survey and six of these students to participate in face to face interviews. The surveys seek to understand student perspectives on the transfer process in relation to relevant policy requirements, and the interviews seek to understand the deeper meaning of the transfer process for students. Findings will present descriptive statistics describing the evaluation survey data, along with themes as they emerge from student experiences captured in the interview process. Conclusions will point towards policy and practice solutions that can improve the transfer process for Social Work students, thus promoting retention, graduation, and overall student success.

UG-P 8

Systematic Literature Review: Best Practices for Collegiate Recovery Communities

Collegiate Recovery Communities are an emerging best practice with a growing evidence base. These communities support students in or seeking recovery from alcohol and other drug addic-tion. The Collegiate Recovery Communities and its programs allow students to have an authentic college experience while maintaining their recovery. These programs would be beneficial to HBCUs as research is emerging showing the negative effects of drug and alcohol on these campuses. There is a small body of research and writings on this topic. This systematic literature review of these writings will apply a Social Work framework to analyze available knowledge. Findings will identify and summarize current best practices for Collegiate Recovery Communities along with a discussion of areas where continued research is needed to ensure these communities are effective in supporting students who are managing and/or at risk for developing problems with substance misuse, abuse, or addiction. Conclusions will point to ways that Social Workers and Universities can utilize these best practices to promote student retention, graduation, and overall student success.

UG-P 9

Student Experiences with Financial Aid

Most students at Tennessee State University rely on financial aid to attend college and many may find that what is available to them is still not adequate. Accessing funds from grants, loans, and other sources allow students to purchase books and other materials needed for class. Delays or problems in the disbursement of funds may make vulnerable students even more vulnerable and could result in students failing or dropping out. This project seeks to evaluate the impact of financial aid policies and practices on students at TSU. A convenience sample of six currently enrolled students who receive financial aid will participate in face to face interviews that seek to understand their experiences with receiving financial aid and how it has impacted their performance academically. Findings will present themes about the experiences of students gathered during the interviews. Conclusions will identify the needs of students in regards to financial aid products and services and will highlight student strengths in persevering limited incomes. Implications drawn will include policy and practice solutions that could improve the financial aid experience for students at TSU, thus promoting retention, graduation, and overall student success.

UG-P 10

Do males and females experience post-incarceration differently in regards to housing and employment

This project presents findings from a community-engaged program evaluation conducted by a Tennessee State University student in service to a local organization serving former offenders in supporting them to re-enter society successfully so as to not recidivate. Specifically, this project seeks to better understand how program participants may experience services differently by their gender in regards to their ability to secure adequate employment and safe housing. Six participants will be recruited from those currently enrolled in the program. Face to face interviews will be conducted with three males and three females. Findings will present themes that emerged from the data along with an analysis of differences in the patterns of experiences with services by gender. Conclusions will seek to inform supports and services provided to former offenders and may reveal that males and females need different kinds of supports in regards to securing jobs and housing.

UG-P 11

Fate and Decontamination of O157 and Non-O157 serogroups of Shiga Toxin-Producing Escherichia coli, including ATCC 43895, as Affected by Elevated Hydrostatic Pressure

Various serogroups of Shiga toxin-producing Escherichia coli including O157, O26, O45, O103, O111, O121 and O145 had been involved in an array of recalls associated with meat products leading to 423 outbreaks from 1998 to 2016. This study investigated fate and effect of elevated hydrostatic pressure on reduction of wild-type phenotype of various serogroups of Shiga toxin-producing Escherichia coli. A 6-strain mixture of Escherichia coli O157:H7, non-O157 Escherichia coli (CDCâ€™s big six serogroups), as well as ATCC 43895 (1992-1993 outbreak strain) were inoculated in 10% meat homogenate. In addition to a two-week aerobic storage trial, hydrostatic pressure at 380 MPa (55,000 PSI) were applied at various time intervals (0 to 10 min) for decontamination of the inoculated serogroups. Analysis of Variance followed by LSD-based mean separations were conducted at type I error level of 5% using OpenEpi software. Experiments were conducted in two biologically independent repetitions, each as a blocking factor of a randomized complete block design. During the aerobic storage at 10ÂºC, O157 E. coli strains were increased (P>0.05) from 5.55 Â± 0.1 to 7.67 Â± 0.2 log CFU/mL of inoculated meat homogenate on days 0 and 14, respectively. Similarly, non-O157 E. coli strains were increased (P>0.05) from 5.81 Â± 0.2 to 7.79 Â± 0.2 log CFU/mL on days 0 and 14, respectively. A treatment at 380 MPa for 10 minutes reduced (P<0.05) the pathogen counts for 1.74, 1.91, and 2.08 log CFU/ml for O157, non-O157, and ATCC 43895 samples, respectively. Treatments below three minutes showed low efficacy (Pâ‰¥0.05) in decontamination of the pathogen. In vast majority of tested time and pressure combinations, O157 and non-O157 E. coli showed similar (Pâ‰¥0.05) sensitivity and reduction patterns. The 1992-1993 E. coli O157:H7 outbreak strain also showed comparable sensitivity to high pressure pasteurization.

UG-P 12

Epidemiology of Foodborne Disease Outbreaks in Tennessee and the United States: A Secondary Analysis of CDC Outbreak Data of 1998 to 2016

Foodborne diseases could affect healthy individuals and more severely at-risk groups such as the very young, the elderly, pregnant women, and the immunocompromised. It is estimated that around 30% of US population are currently considered as at-risk individuals for foodborne diseases. Recent epidemiological estimates of the Centers for Disease Control and Prevention indicate as high as 1 in 6 Americans experience foodborne diseases every year, leading to more than 127,000 episodes of hospitalizations and around 3,000 deaths. From 1998 to 2016, there have been more than 19,900 single or multistate outbreaks leading to about 380,000 illness with 4% rate of hospitalization.

Information derived from active surveillance of the Centers for Disease Control and Prevention from 1998 to 2016 were analyzed and will be presented in the current study. Particular emphasis has placed on comparison of Tennessee-related food safety outbreaks, illnesses, hospitalizations, and death episodes as related to national statistics. In addition, Disability Adjusted Life Year (DALY) of main foodborne pathogens of concern in Tennessee will be presented.

UG-P 13

Prescribed Burning and Thinning Impacts on Soil pH and Conductivity in Managed Pine-Harwood Forests of the Southeastern United States

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Prescribed Burning and Thinning Impacts on Soil pH and Conductivity in Managed Pine-Harwood Forests of the Southeastern United States

Forested ecosystems play important societal and ecological needs. When managed in accordance with historical disturbance regimes, forests provide habitat for wildlife and ecosystem services for societal needs. When forests are not managed correctly, they no longer provide ecosystem function due to overcrowding, disease, and competition for light and nutrients. Prescribed fire and thinning are two widely applied management techniques that can prevent and/or restore degraded forests. Soil samples from the William B. Bankhead National Forest located in northwestern Alabama, USA were collected in September of 2016 and 2017 to evaluate the impacts of two forest management strategies of soil pH and conductivity. We collected a total of 2 soil samples from each of 18 forest stands during both study years. We determined post-management impacts of management via a mixed model analysis of variance and results will be presented. Findings from this study will be incorporated into results from small mammal and tick survey efforts that are currently ongoing in the same research stands. As soil chemistry and nutrient dynamics are important for all forested ecosystem processes, it is important to understand the ecological impacts of repeated forest disturbances.

UG-P 14

Assessing Food Environment and Food Business Pattern around Metro Nashville Area: Implication for Nutritional Security of Households

USDA emphasizes on ensuring access to safe, nutritious, and balanced diet to everyone. Easy access to healthy food is a function of well-organized local food systems. Food retail environment and growth can be considered as an indicator of food demand in the area. This study aims to understand food retail structure, its pattern and growth in the Nashville metropolitan area. We used county business pattern data from US Census Bureau and zip-code level information for selected categories of food retails under industries in NAICS. Fruits and vegetable stores, food convenient stores, food groceries, farmers markets and food restaurant establishments by different size were examined and compared. Additionally, we discuss results and implications in reference to the economic and demographic settings.

UG-P 15

Assessing vocabulary skills: Is Type Token Ratio a valid assessment measure?

Type Token Ratio (TTR), which is a measure of lexical diversity, has long been accepted as a way to analyze a speakerâ€™s vocabulary skills. Specifically, the TTR analysis aims to measure vocabulary richness by differentiating between the total words produced and total number of different words produced. However, there is research that suggests that TTR may not be a reliable or consistent measure. Despite the growing body of evidence against its usage, researchers in the field of Speech-Language Pathology continue to use this measure in their assessment procedures.

The purpose of this study is to add to the body of research examining the clinical relevance of Type Token Ratio as it pertains to the assessment of vocabulary skills of preschool children. Twenty three preschool children (ages 3-5) participated in this study. Vocabulary skills were measured via three methods: standardized testing, incidental word learning and TTR. This study aims to answer the following research questions:

Is there a significant difference between standardized test performance and TTR?

Is there a significant difference between incidental word learning and TTR?

UG-P 16

Investigation of in vitro Cytotoxicity of Fluorinated Hexahydroquinoline in Human Breast Cancer

Investigation of in vitro Cytotoxicity of Fluorinated Hexahydroquinoline in Human Breast Cancer.

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Abstract:

Quinoline and derivatives have attracted the attention of chemists in industry and academia due to their wide range of biological activities, including antibacterial, antimalarial and antitumor activities. They are often found as important pharmacophores in natural products and semi-synthetic compounds. In continuation of our search for anticancer compounds, we synthesized some fluorinated hexahydroquinoline derivatives and evaluated their in vitro cytotoxic activity in human cancer cell lines, MCF-7 and BT549. In addition, it is known that high concentration of estrogen is observed in breast cancer tissues, which puts patients at high risk of developing breast cancer. We hypothesize that small molecule hexahydroquinoline will block the activity of aromatase and result in the development of drug for the treatment of breast cancer. The overarching question is whether the compound interacts with the above enzyme. Thus, we used molecular modeling to investigate possible interaction of the synthesized compounds with aromatase, with the ultimate goal of finding binding conformations, which will provide clues for the mechanism of action of the compounds. The in vitro cytotoxicity and ligand-protein interaction data will be presented.

UG-P 17

Tributyltin Effects on Akt/Protein Kinase B and Ribosomal S6 Protein Phosphorylation

The ERK1/2 and p38 mitogen activated protein kinase (MAPK) pathway have been shown to be activated by exposure to the environmental contaminant tributyltin (TBT). TBT is found to contaminate a number of food products that humans consume resulting in measureable levels in human blood (ranging as high as 261 nM) as well as other tissues. Recent studies have shown that TBT at certain concentrations increases the production of the pro-inflammatory cytokine interleukin 1 beta (IL-1Î²) from human lymphocytes without increasing the mRNA for IL-1Î². TBT-induced production of IL-1Î² appears to require the ERK1/2 and p38 pathways. However, it is possible that TBT may be activating other pathways such as Akt/protein kinase B (PKB) which could also contribute to its ability to increase IL-1Î² production. Additionally, downstream substrates of both ERK1/2 and Akt/PKB can lead to the activation of protein synthesis in part by stimulating phosphorylation of the ribosomal S6 protein. Thus, the current study examines whether TBT is able to activate Akt/PKB and S6 phosphorylation as possible mechanisms for the TBT-induced increases in IL-1Î² production. Human lymphocytes were exposed to TBT for 10 minutes. Following the exposure the cells were lysed. The lysates were analyzed using western blot. Antibodies specific to the activated forms of Akt/PKB and S6 were used. Initial results indicate that exposure to TBT increases the activation of Akt/PKB and S6. Thus, it is possible that TBT is stimulating IL-1Î² production by activating both MAPK and Akt/PKB signaling pathways leading to increased translation of IL-1Î². Supported by grants U54CA163066 and 4T34GM007663 from the National Institutes of Health.

UG-P 18

Exposure of Human Immune Cells to Triclosan Alters the Secretion of Interferon gamma

Triclosan (TCS) is a synthetic chemical with antibacterial function that inhibits the growth of microorganisms. TCS is used as an antifungal and antibacterial agent in many products such as: toothpaste, soaps, detergents, toys, surgical cleaning treatments, cosmetics, kitchenware, clothes, and office and school products. It is found in human blood and tissue samples. Interferon gamma (IFNÎ³) is a cytokine that is specialized for innate and adaptive immunity against viral infections. IFNÎ³ is important for immunity against intracellular pathogens and for tumor control. As a pro-inflammatory cytokine, inappropriately elevated levels of IFNÎ³ can cause chronic inflammation, which has been shown to enhance the development and progression of certain cancers as well as other diseases. Accurate regulation of IFNÎ³ levels is important to avoid the loss of immune capability or the occurrence of chronic inflammation. The aim of this study is to investigate whether TCS alters the secretion of IFNÎ³ from human immune cells. Human peripheral blood mononuclear cells (PBMCs) were treated with 0 -5 Î¼M TCS for 24 h, 48 h, and 6 days. IFNÎ³ levels were measured by enzyme linked immunosorbent assay (ELISA). After a 24 h exposure to TCS there were significant increases in IFNÎ³ seen at several concentrations in all donors tested (total of 4 distinct donors). The specific concentration at which increases occurred varied among cells from different donors. Increases in IFNÎ³ secretion were also seen after 48 h and 6 day exposure to TCS at certain concentrations. Thus, it appears that TCS is capable of disrupting secretion of this important immune system regulating cytokine which could have the potential to increase the potential for chronic inflammation.

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UG-P 20

Triclosan Alters the Secretion of Tumor Necrosis Factor alpha from Human Immune Cells.

Triclosan (TCS) is an environmental contaminant added as an antibacterial agent to many products including mouthwashes, soaps, and toothpastes. TCS can be absorbed through skin and mouth and is found in human blood, urine, amniotic fluid, and breast milk. Tumor Necrosis Factor Alpha (TNFÎ±) is an essential pro-inflammatory cytokine that is produced by monocytes, macrophages, lymphocytes and neutrophils. TNF acts as a systemic inflammatory mediator in response to sepsis and infectious disease. While a normal inflammatory response is critical to health, high levels of inflammatory proteins such as TNFÎ± can lead to chronic inflammation which contributes to a number of disease states including cancer. Alternatively, if immune cells are unable to secrete adequate amounts of TNFÎ± this would leave the organism susceptible to infections. Previously, we have shown man-made environmental contaminants that gain access to the human system are able to alter the secretion of TNFÎ± from human immune cells and we hypothesize that TCS also has the capacity to alter TNFÎ± secretion. In the current study, peripheral blood mononuclear cells (PBMCs) were treated with TCS at concentration of 0.05-5ÂµM for 24 h, 48h, and 6 days. TNFÎ± level was measured by using enzyme-linked immunosorbent assay (ELISA). The result showed that 24 h exposure to TCS caused a significant increase in TNFÎ± secretion at 5ÂµM in cells from 4 separate donors. This increase maintained at 48 h and 6 days of exposure. Other concentrations of TCS, including the lowest of 0.05 ÂµM, also caused significant increases in TNFÎ±, but the specific concentrations at which the increases were seen varied among donors. These data show that exposure of (PBMCs) to TCS alters the secretion of TNFÎ±. TCS has the capacity to increase this important master regulator of inflammation, which would have the potential to lead to development or exacerbation of several disease states.

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UG-P 21

Modulation of Phospho Tensin Homolog (PTEN) in Cancer Cells and Preadipocyte Cells Following Exposure to Flavonoids

Plant flavonoids have been shown to offer more protective health benefits against oxidative deoxyribonucleic acid (DNA) damages caused by ï §-ray radiation, UV irradiation, chemicals, and endogenous oxidative stress. The above compounds have been shown to can modulate the activity of enzymes and affect the behavior of many cell systems. While these may account for the anti-mutagenic activities of flavonoids in experimental systems, relatively little is known about the mechanisms of the modulation of PTEN activity in cancer cells. The objectives of this study was to investigate the effects of three flavonoids: quercetin, kaempferol and genistein on the expression levels of both phospho- and total-PTEN in breast cancer (BT-549), lung cancer (A-549) and human preadipocytes (3T3-L1 which was used as controls). Cells were seeded and were exposed to each of the flavonoid at concentrations of 0, 5, 10, 15, 20 and 25 ÂµM and the phosphorylation of PTEN at Ser380, total PTEN levels were measured. The results indicate the flavonoids increased both phospho-PTEN- and total-PTEN levels increased in a dose-dependent manner. The effect of quercetin was more pronounced followed by genistein and kaempferol. The findings suggest that the flavonoids play an important role in controlling oxidative stress in cells.

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UG-P 22

White-eyed Drosophila are a model of rapid aging

White-eyed Drosophila are a model of rapid aging. Phyllicia Hemphill2, V. Weake1, Purdue University. S. Nahashon, and T. Taylor, Department of Agricultural and Environmental Sciences, College of Agriculture, Human and Natural Science, Tennessee State University, 3500 John A. Merritt Blvd. Nashville, TN 37209.

Humans are more susceptible to ocular disease and macular degeneration as they age. Drosophila melanogaster (fruit flies) are a model organism used to study photoreceptor aging. Blue-light is a known stressor of cellular components in photoreceptors. Due to their lack of pigment, white-eyed flies are more sensitive to light stress than red-eyed flies. Based on previous studies, when comparing 10 versus 40 day old red-eyed flies, phototaxis decreased two-fold. When 1 day old white-eyed flies were exposed to eight hours of blue light only 1% had rhabdomere loss, while 6 day old flies under the same condition had a more drastic phenotype of 62%. However, there has not been an assessment of their visual function as they age under normal light conditions. The current study assesed a time-course of white-eyed flies aged from 1 to 6 days using a phototaxis assay. We hypothesized that white-eyed flies will have a more rapid decline in phototaxis than red-eyed flies as they age due to their increased sensitivity to light stress. Our results showed, white-eyed flies phototaxis decreased noticeably in the six day time course when compared to the red-eyed control replicates. In conclusion, using a phototaxis assay showed over time white-eyed flies phototaxis decreased implying that drosophila melanogaster could be a possible model to study photoreceptor aging. (REU Program)

UG-P 23

Highly Substituted Esters From ArCOPdCI and Tertiary Alcohols

Esters are incredible compounds that have a variety of applications in medicine, agriculture chemistry, polymer chemistry, and petrochemicals. In the Fischer Esterification, esters are formed when a carboxylic acid and an alcohol are heated in the presence of a catalyst. In the Yamaguchi Esterification, a reaction occurs between a carboxylic acid and the Yamaguchi Reagent resulting in the formation of a mixed anhydride. The anhydride is then introduced to an alcohol, in the presence of a catalyst, which produces the desired ester. In a direct cross-coupling reaction between benzoyl chlorides and tertiary alcohols and in the presence of a palladium catalyst, we will explore the possibility of making highly substituted esters.

UG-P 24

Probing the Role of the Medial Prefrontal Cortex in Female Sex Behavior

It is typically thought that animals engage in sex primarily for means of reproduction. However, all animals, including humans, actually perform this motivated behavior for its rewarding consequences. Studies in the lab have demonstrated increased activity from sex in the nucleus accumbens (NAc), a key region of reward circuity, as well as in the medial prefrontal cortex (mPFC), an area known for its involvement in goal-directed behavior. Since the mPFC provides glutamatergic afferents to the NAc, our lab wanted to determine if activation that is seen in mPFC and NAc are related to the same circuitry. To do this, we examined the expression of c-Fos in inhibitory (GABA) and excitatory (glutamate) neurons in the mPFC to elucidate which cell type is activated during sex to determine whether the mPFC is driving the NAc activity. The mPFC neurons were labeled for both c-Fos, a marker of activation, as well as a marker for GABA, glutamic acid decarboxylase (GAD). Results suggests that sex activates c-Fos primarily outside of GABAergic cells in the glutamate neurons of the mPFC, neurons forming the primary output to the NAc. These results implicate the mPFC and NAc as integrated structures in reward circuitry in female sex behavior.

UG-P 25

Identification of Iso-Preferred Reinforcers for Use in an Instrumental Reward Devaluation Task

The Rat Model of Binge Eating is utilized because of its ability to identify the binge eating phenotype through intermittent access to highly palatable food. Within the Rat Model of Binge Eating, there are three phenotypes that makeup a spectrum of BE including Binge Eating Prone (BEP), Binge Eating Neutral (BEN), and Binge Eating Resistant (BER). The Instrumental Reward Devaluation Teat (IRDT) which is a test of impulsive choice and habit was the focus of our behavioral research. Some performance on the IRDT showed a statistically insignificant preference for one palatable reward over the other. It was necessary to find an iso-preferred palatable reward combination that would diminish this slight preference to there being no observed preference between the two rewards. To accomplish this goal we used the two-bottle Choice Test and the one-bottle Acceptance Test to measure ratsâ€™ consumption. After analyzing ratâ€™s consumption of their assigned reinforcer pairs for both tests by way of Dependent Sample t-tests, we found the consumption of the reinforcer pair of 20% Sucrose with Orange Kool-Aid and 20% sucrose with Lime Kool-Aid to be statistically insignificant across both tests. These results indicate this reinforcer pair as being iso-preferred.

UG-P 26

Dendritic Spine Analysis of Striatal Spiny Projection Neurons in the Mouse Model of Fragile X Syndrome

Fragile X syndrome (FXS) is the most common form of inherited intellectual disability and the leading genetic cause of autism spectrum disorder. FXS is caused by a repeating CGG mutation in the FMR1 gene leading to a decrease in fragile X mental retardation protein (FMRP) and is highly expressed in neurons, especially in dendritic spines. Neocortical neurons from FXS patients and FMRI1 knock-out (KO) mice have an increased density of abnormally elongated dendritic spines, suggesting that the decrease of FMRP is linked to abnormal spine development, leading to alterations in synaptic transmission. The striatum is the input nucleus of the basal ganglia, a group of subcortical brain regions implicated in voluntary motor control and learning. In this study we performed two-photon laser scanning imaging of fluorescently labeled SP neurons from WT and Fmr1 KO mice. Image series in the z-plane of proximal and distal dendrites from SP neurons were used to count and classify dendritic spines into distinct subtypes based on shape and overall length. We hypothesize that the spine alterations seen in the neocortex of FXS patients and Fmr1 KO mice extends to the SP of the striatum and this morphological change can lead to alterations in synaptic transmission.

UG-P 27

Effects of the Expression of Foxp2 in corticothalamic neurons on cortical development

Early studies identified mutations in Foxp2 that were associated with individuals who had developmental speech and language disorders. Human clinical studies suggest that Foxp2 is involved in the development of brain structures that are important for the ability to produce effective language, raising new questions about what role Foxp2 might play on the developing brain, Foxp2 is a DNA binding protein transcription factor, which has been implicated in the development of many structures in the human brain. To examine the role of Foxp2 we first sought to define the specific cortical neuron subtypes that express Foxp2 during development through a combination of retrograde tracing to identify neurons in the cerebral cortex that project to different targets, and immunohistochemistry to localize proteins that are well known markers of specific types of cortical neurons. We found, that Foxp2 was expressed more in corticothalamic neurons rather than corticocortical neurons. If Foxp2 is playing a role in cortical development, it should impact the corticothalamic neurons more. We used conditional Foxp2 knockout mice where we genetically deleted Foxp2 from the cerebral cortex. Using confocal microscopic imaging and cell counting methods, we are examine whether Foxp2 alters the number of the specific neurons subtypes.

UG-P 28

Effects of Physical Activity and Sedentary Behavior on Brain Responses to High-Calorie Food Cues in Obese and Lean Young Adults

This research project examined the relationship between time spent performing physical activity/sedentary behavior, and the brainâ€™s response to high-calorie food cues, which is known as â€œjunk foodâ€ . The physical activity data was collected through the use of Physical Activity Recall Questionnaire (PAR). Participants were shown high calorie food cues and non-food cues, and brain activity data was gathered through the use of fMRI. Whole brain analysis, and ROI analysis were done to explore the relationship between MVPA minutes and neural food cue reactivity within the whole brain. After data analysis, it was shown that MVPA may have beneficial effects on brain regulation of feeding behavior in both lean and obese individuals by decreasing activation to high calorie food cues. Alternatively, SB was shown to contribute to higher food activity in obese people. This study and others can be used to further analyze the role of behavior on weight maintenance and cardiovascular health.

UG-P 29

Are Vocal Tics in Tourette's Syndrome Speech-Like?

Tourette syndrome (TS) is a developmentally regulated neurobehavioral disorder characterized by involuntary, stereotyped, repetitive movements. Certain temporal and tonal properties of words during voluntary speech are predictable. Words shrink and stretch depending on where they occur in a prosodic phrase. The same word has shorter duration if it is distal from a prosodic boundary and longer duration if it is proximal to a prosodic boundary. Therefore, we wanted to examine if vocal tics in TS are Speech-Like. We used audio scripted speech and spontaneous vocal ticking that was recorded from a Ted talk Speaker in females that spoke a variety of British English with TS. Segments of audio were prepared into tic and non-tic portions. We used ? software to obtain measures of Tic and non-tic interval intonation and durations. Upon analysis, we found that vocal tic intonation disrupts surrounding utterance intonation. However, vocal tic intonation varies. The duration of tics inside prosodic phrases was more stereotyped than the duration of tics outside prosodic phrases (i.e. during pauses). In other words, vocal tic duration varies as a function of prosodic grouping. Future studies will examine if the vocal tics variation is systematic and is the variability in duration due to word duration.