SETAC NORTH AMERICA 38TH ANNUAL MEETING

November 12, 2017 — November 17, 2017

Minneapolis Convention Center

1301 2nd Ave S

Minneapolis, Minnesota 55403

Environmental Toxicology Program (M.S. & Ph.D.)
Department of Environmental &Interdisciplinary Sciences
EIS.TSU.EDU

Society of Environmental Toxicology and Chemistry

2017 South - Central Regional Meeting

April 28-29, 2017

"Environmental Justice"

Texas Southern University

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On behalf of the Office of the Provost at Texas Southern University (TSU), I welcome you to the South-Central Regional Meeting of the Society of Environmental Toxicology and Chemistry (SETAC). It is my pleasure to invite you to participate in the technical sessions and workshops. I also encourage you to partake in the many historical attractions in the City of Houston, starting with our beautiful campus. I especially welcome the students, professional members, academic partners and industrial supporters.

This year's theme, "Environmental Justice" further strengthens SETAC's mission to the organization. *To support the development of principles and practices for protection, enhancement and management of sustainable environmental quality and ecosystem integrity.* The mission and the goal of this regional meeting only seeks to increase the knowledge and skills of environmental scientists and chemists to further ensure that all are protected from environmental hazards.

As you visit the technical sessions and network with faculty, students, and industrial professionals, I am confident you will increase your desire to understand the multifaceted world of environmental toxicology and chemistry.

Please allow me to close by thanking you for your support and attendance at the South-Central Regional Meeting of SET AC being hosted by the TSU-SETAC student chapter.

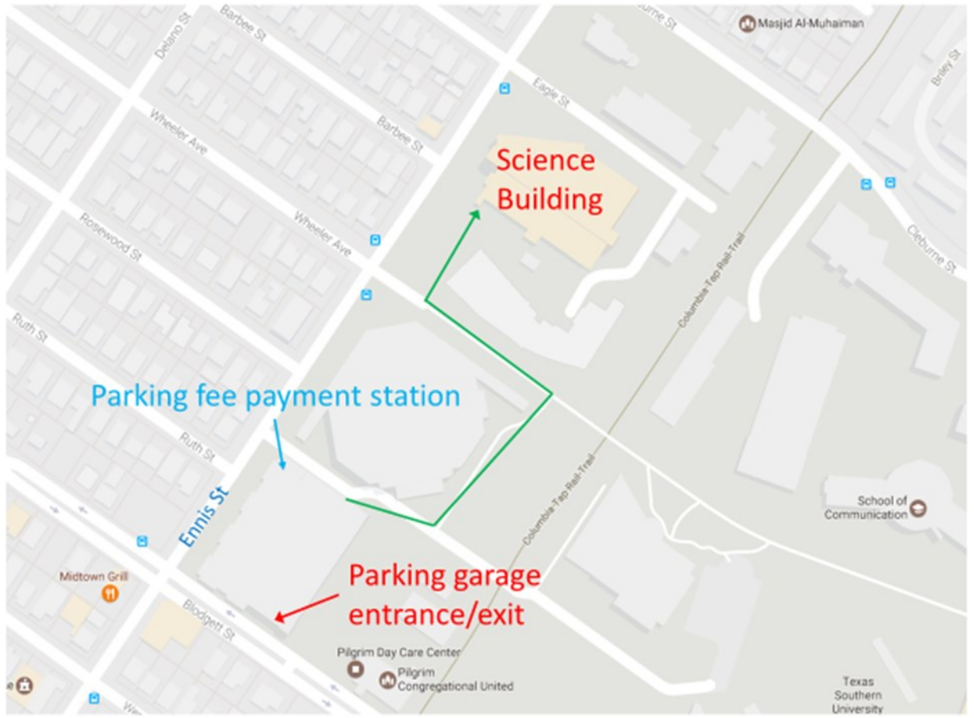
Sincerely,

Bobby Wilson, Ph.D.

Interim Provost and Vice President of Academic Affairs

AN EQUAL EDUCATIONAL OPPORTUNITY INSTITUTION

VISITORS PARKING TO SCIENCE CENTER



⇒ **Follow green arrow to come to Science Building from the Parking Garage.**

⇒ **Parking fee is $3.00 per day.**

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Meeting Agenda

Friday, April 28, 2017

12:00 p.m.— 1:00 p.m.	Registration	
1:00 p.m.— 5:00 p.m.	Student Workshop	Science Building , 303H

Saturday, April 29, 2017

7:30 a.m.— 10:30 a.m.	Registration	Science Building, Atrium
7:30 a.m.— 8:20 a.m.	Breakfast	Science Building, Atrium
8:00 a.m.— 8:20 a.m.	Greetings	Science Building, Room 156

Dr. John Sapp, Dean, College of Science, Engineering, and Technology
Dr. Shishir Shishodia, Chair,
Department of Environmental & Interdisciplinary Sciences

8:20 a.m.— 9:40 a.m.	Platform Session I	Science Building, Room 156
9:40 a.m.—9:55 a.m.	Break	
9:55 a.m.— 11:30 a.m.	Platform Session II	Science Building, Room 156
11:30 a.m.— 12:50 p.m.	Lunch	Science Building, Atrium
12:50 a.m.— 2:10 p.m.	Platform Session III	Science Building, Room 156
2:10 p.m. — 2:25 p.m.	Break	
2:25 p.m. — 3:50 p.m.	Platform Session IV	Science Building, Room 156
4:00 p.m.— 4:30 p.m.	Business Meeting	Science Building, Room 146
4:30 p.m.— 5:30 p.m.	Poster Session	Science Building, Atrium
6:00 p.m.— 7:30 p.m.	Awards Dinner	Science Building, Atrium

Sunday, April 30, 2017

9:00 a.m.— 11:30 a.m. Toxic Tour (Cancelled)

PLATFORM PRESENTATION SCHEDULE

Morning Platform Session I

1. Shanoy C. Anderson
2. Peter C. Bruns
3. Caleshia S. Calvin
4. Matthew J. Fiala
5. Marco E. Franco

Morning Platform Session II

1. Amanda French
2. Pavani Gonnabathula
3. Alex Kascak
4. Julie C. Kryzkwa
5. Steven Lasee
6. Lihua Lou

Afternoon Platform Session I

1. Jason Magnuson
2. Michelle M. Memanus
3. Mourina O. Mogem
4. Celeste Ortega-Rodriguez
5. Elias Oziolor

Afternoon Platform Session II

1. Eric M. Peterson
2. Mitchell Schynder
3. Kelsey N. Thompson
4. Onyanobi Abel-Anyebe

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ABSTRACTS FOR PLATFORM SESSION

Chlortetracycline in White-tailed Deer (Odocoileus virginianus) and Supermarket Meat by Liquid Chromatograph-tandem Mass Spectrometer

***Shanoy C. Anderson**, Seenivasan Subbiah, Angella A. Gentles, Paul Stonum, Tiffanie A. Brooks, Ernest E. Smith*

A method for determining chlortetracycline residues in edible white-tailed deer tissues, using liquid chromatograph with heated electrospray ionization and mass spectrometer detection. The procedure involved an extraction with EDTA-McIlvaine buffer at pH 4.0, followed by solid-phase extraction cleanup using a Hydrophilic-Lipophilic Balance (HLB) cartridge. The liquid chromatography analysis was performed with heated electrospray ionization and mass spectrometry detection. The limit of quantification for the method was 2.7µg/kg and limit of detection was 0.8 µg/kg. The recovery values were greater than 78.5% for muscle, 65.1% for kidney, 63.1% for liver. Mean tissue residue concentration of chlortetracycline (CTC) and it's epimer 4-epi chlortetracycline (4-epi-CTC) at 10-day withdrawal period for kidney, liver, muscle 122.8, 44.7 and 26.7 µg/kg respectively. Chlortetracycline tissue residue concentration at 45-day withdrawal period for kidney, liver, muscle 19.2, 28.9 and 10.7 µg/kg respectively. Mean tissue concentration of CTC + 4-epi-CTC were less than the established maximum residual limit (MRL) values for bovine tissues. The method has been successfully used for the quantification of chlortetracycline in white-tailed deer tissue samples.

Reproductive Effects of Early Life Stage Thyroid Disruption in the Fathead Minnow

***Peter C. Bruns**, Bethany L. Pierce, Mallory M. Seemann, and Marlo K. Jeffries*

Exposure to contaminants during development have the potential to cause adverse biological alterations that can persist through depuration periods and into adulthood. This study examined the effects of chemically induced, early-life-stage thyroid disruption on endpoints associated with thyroidal and reproductive function in the fathead minnow (*Pimephales promelas*). Fish were exposed to propylthiouracil (PTU) from 1 to 43 days post hatch (dph) to induce hypothyroidism. At the end of exposure, length and weight were measured and samples were taken for gene expression analysis. The remaining fish were transferred to un-dosed water and raised to maturity and, at 164 dph, a 21-day breeding assay was performed. At the end of exposure, fish exposed to PTU had significantly reduced length, weight, and condition factor. There were also significant differences in expression of several genes involved in the thyroid and reproductive signaling systems. After maturation, there were no significant differences in any morphological variables. During the 21-day breeding assay, fish exposed to PTU during development had significantly reduced number of clutches and eggs per clutch, and significantly reduced overall fecundity. The results show that early-life-stage hypothyroidism can affect reproductive function later in life even after thyroid related endpoints have returned to control levels.

Cytochrome P4501A Expression in Chorioallantoic Membrane, Liver, and Skin of Kemp's Ridley Sea Turtles (Lipidochelys Kempii)

***Caleshia S. Calvin**, Kimberly D. Hickok, Janet E. Yacabucci, Donna J. Shaver, Céline A.J. Godard-Codding*

The 2010 Deepwater Horizon incident is the largest oil spill in the history of the United States. This anthropogenic disaster impacted the Gulf of Mexico's coastal ecology and exposed countless marine organisms, such as sea turtles, to oil. The primary habitat of the critically endangered Kemp's ridley sea turtle (Lipidochelys kempii) is the Gulf of Mexico, leading to concern for their welfare and conservation. Under the direction of the U.S. Department of the Interior, a Natural Resource Damage Assessment was put in place to evaluate the effects of this spill and appraise future restoration efforts. The project presented here is part of this assessment. Cytochrome P4501A (CYP1A) expression is a known biomarker of exposure to chemicals, including polycyclic aromatic hydrocarbons present in crude oil. CYP1A protein expression in Kemp's ridley was evaluated via immunohistochemistry in both skin biopsies of nesting mothers collected in 2011 and paired liver and chorioallantoic membrane (CAM) tissues of late stage hatchings collected in 2010 and 2011 from Padre Island, TX, USA. CYP1A expression was measured following the methods of Godard et al. (2004). Tissues were formalin-fixed, embedded in paraffin, sliced by microtome and mounted on microscope slides, prior to staining with monoclonal mouse antibody. CYP1A expression was low in all samples analyzed. A moderate positive correlation in CYP1A expression was observed between liver and CAM tissues, supporting the relevance of CAM samples in endangered species studies where non-invasive samples are required. Future analyses comparing CYP1A expression amongst sampling years and various organs is underway.

ABSTRACTS FOR PLATFORM SESSION

Sources of Fine Sediment Particles in Roadway Stormwater Runoff in the Lake Tahoe Basin

***Matthew Fiala**, Hyun-Min Hwang, Russel Wigart, Raph Townsend, Veronica Edirveerasingam*

The clarity of Lake Tahoe water column has declined since the late 1950s. More than 50% of Lake Tahoe's clarity loss can be attributed to fine sediment particles (< 16 mm) from various sources. This study was to identify major sources of fine sediment particles and associated phosphorus in winter roadway runoff, quantify the contribution of each major source, and investigate time-series change of runoff turbidity and elemental composition of fine sediment particles. Roadway runoff samples were collected using ISCO automatic water sampler from two sites (Cattlemans and Pioneer) located on Pioneer-Trail in the Lake Tahoe Basin. Runoff samples were measured for turbidity and sieved (20 μm) to collect fine sediment particles. Organic matter content, oil and grease, elements (Co, Cr, Cs, Cu, Fe, Li, Mn, Ni, Pb, V, Zn), and organic markers were quantified to calculate the contribution of fine sediment particles from various sources using chemical mass balance model. Approximately 50% of fine sediment particles in roadway runoff originated from non-traffic related sources such as eroded soil and vegetation debris from road side hills. It is interesting to note that asphalt pavement wear particles accounted for 30.6 ± 7.6%, which is the second most abundant source of fine sediment particles in collected roadway runoff. These particles were produced when snow plow steel blades and tire chains grind asphalt pavement. The contribution of abrasive sand 16.2 ± 4.3%. To reduce the loading of fine sediment particles and avoid installation of new treatment BMPs, side hill soil erosion control and new roadway management practices (e.g., plastic blade rather than steel blade for snow plow) must be adopted.

Crude Oil Disrupts Bioturbation Activity, Increases Oxidative Stress and Results in Histopathological Changes in the Hepatopancreas of the Fiddler Crabs *Uca Longisignalis* and *Uca Panacea* from the Northern Gulf of Mexico

***Marco E. Franco**, Paul L. Klerks, Bruce E. Felgenhauer*

Two of the most common macroinvertebrate species in coastal ecosystems from the northern Gulf of Mexico are the gulf marsh fiddler crab (Uca longisignalis) and the gulf sand fiddler crab (Uca panacea). Their burrowing and feeding activities are fundamental for sediment oxygenation and nutrient availability in coastal sediments. Due to high activity of the oil and gas industry in the gulf and the prominent danger for oil spills, fiddler crabs are at a constant risk of being exposed to crude oil. To obtain insight into the toxicity of crude oil to fiddler crabs, mesocosms were established in a greenhouse, and filled with sediment and water from fiddler crab collection sites in Grand Isle, LA. Experiments were conducted for 10 days, for each species separately and for both species combined. Fiddler crabs were exposed to crude oil concentrations of 5 to 55 mg/cm2, by spreading an oil-sediment mixture over the sediment surface in each mesocosm. Oil exposure led to significant reductions in burrow size (diameter, depth and volume) and in their bioturbation (mixing of surface sediment to different depths). Additionally, both species showed increased oxidative stress, quantified by the TBARS assay, after exposure to high concentrations of crude oil. Because oxidative stress usually induces membrane damage, light microscopy is currently being used to assess the occurrence of morphological changes and histological damage in hepatopancreas cells. The results from this study provide further insight into the potential for oil spills to disrupt the important ecological processes mediated by fiddler crabs.

Presence of Antimony as Evidence of Lead Shot Ingestion by American Woodcock

***Amanda French,** Warren Conway, David Klein*

Lead (Pb) ammunition left in the environment can be consumed by birds and cause health problems including lethargy, anorexia, and death. The danger of Pb ammunition has been well documented in waterfowl, but remains a concern for webless migratory game birds, upland gamebirds, and scavenger species. The American woodcock (*Scolopax minor*) is a small, webless migratory gamebird known to have elevated tissue Pb concentrations. The primary source of Pb in woodcock is postulated to be Pb shot, however, current source determination methods have not substantiated this claim. To identify a reliable and consistent signature of Pb shot presence in birds, we hypothesized that the trace metal antimony (Sb) would be a suitable indicator of Pb shot exposure. Antimony is added to Pb shot pellets to increase pellet hardness and is not found in high concentrations (typically < 0.5 ppm) within the environment. Therefore, Sb would be a reliable indicator of Pb shot exposure in woodcock if Sb is > 0.5 ppm in woodcock tissue, as Pb shot is the most likely source of elevated Sb. Lead and Sb concentrations were determined in 196 hatch year (< 10 month old) woodcock feathers and wing bones. A positive correlation between Pb and Sb (feather $r^2 = 0.51$; bone $r^2 = 0.80$) was found in both tissues, indicating that Pb shot is a source of elevated Pb in woodcock. This experiment has provided proof of concept to show the potential reliability of using antimony as an indicator of Pb shot exposure in birds

ABSTRACTS FOR POSTER PRESENTION

In-Vehicle Noise Pollution Exposure on Highways

Qing Li, Fengxiang Qiao, Lei Yu

Noise is one of the typical hazardous emissions. Regular and long-term exposure to elevated noise can bring about various adverse health effects, such as hearing impairment, hypertension, ischemic heart disease, annoyance, and sleep disturbance. Various noise pollution controls have been implemented in households, industries, traffic and other noise sources; whereas an automobile cab has been never regarded as a place that needs to protect passengers and drivers from the noise. In practice, most of the people in the U.S. still rely on their personal vehicles for mobility and each of them spends plenty of time on daily commuting and being stuck in traffic. There is a lack of studies in the in-vehicle noise exposure levels during commuting time and the risk of adverse health consequences to the public. This research intends to investigate the distribution of the in-vehicle noise exposure, assess the risk of the in-vehicle noise exposure for commuters. An on-road driving test was conducted on the State Highway 288 in Houston Texas in May 2016. Twelve subjects were recruited to drive a dedicated vehicle through a designed 35-km-long test route. The test vehicle's real-time activity information and in-vehicle sound levels were collected by an On-board Diagnosis II and a digital sound meter, respectively. Results show that commuters are chronically exposed to the in-vehicle noise at the level between 75 dB(A) and 85 dB(A) on highways, which can cause negligible risk of hearing impairment.

Determining Phytotoxicity of Carbon Nanotubes in Heat and Drought Stressed Crops

Juliette Jordan, Jaclyn E. Canas-Carrell, Paxton Payton, David Tissue

Carbon nanotubes (CNT) are manufactured nanomaterials currently being used in medical and pharmaceutical devices, waste water treatment, and electronics. Because of their wide range of uses and small size, CNTs are an emerging and growing contaminant of concern. This study evaluated the effects of multi-walled carbon nanotubes (MWCNTs) in soil on heat, drought stressed tomato and drought stressed cotton. Tomato plants were grown in a greenhouse under regular growing conditions during which time the greenhouse was held at an average temperature of 28°C (day and night). Cotton plants were not grown under heat stress. A subset of both tomato and cotton plants was also subjected to water deficit conditions. Photosynthetic response was measured before, during, and after the water deficit. Plants grown in soil mixed with CNTs showed delayed early growth. CNT exposure influenced tomato and cotton plant photosynthetic response to water deficit stress. Results of past studies have varied depending on plant species and type of CNT. However, whether there is variability in stress response or an impact of climate for different species has yet to be determined. More research is needed on the effects CNTs have on different crop species and different genotypes under varying environmental conditions.

ABSTRACTS FOR POSTER PRESENTION

26. Impact of Ramp Metering Strategy on Vehicle Exhaust Emissions

***Jianbang Du**, Qing Li, Fengxiang Qiao, Lei Yu*

Ramp meters are signal devices installed on highway ramps to regulate the traffic flow according to current traffic conditions on highway. Texas Department of Transportation has operated 60 ramp meters in Houston district since 1990s. The ramp metering strategy increases the average vehicle speed and decreases the accident rate and driving time significantly. However, there is no sufficient study focusing on vehicle exhaust emissions at ramp metering. This research attempts to obtain an insight into vehicle emission levels when the ramp metering strategy is implemented. On-road driving tests were conducted during peak and non-peak hours along the South Bound of Houston highway I-45 N, which includes 6 on-ramps. The ramp meters were activated mainly during peak depending on traffic demands. The exhaust emission data was collected on a dedicated light-duty vehicle by using a portable emissions measurement system (PEMS), an On-Board Diagnosis (OBD) II recording system, and a GPS device. Statistical result showed that the on-ramp exhaust emissions were increased while the mainline exhaust emissions decreased if the ramp metering strategies are activated. Since the ramp flow is far less than the mainline flow, the entire exhaust emissions for the whole highway system were decreased. This means that a ramp metering strategy could induce the air quality benefit of the highway system. It is suggested further improving ramp metering strategies towards an integrated control in Houston highway system for better beneficial effects.

27. Subleathal Toxicity of the Harmful Haptophyte *Pryminesium Parvum* to Two Common Fish Species

***Bridgett N. Hill**, Jone Corrales, Lauren A. Kristofco, W. Baylor Steele, Gavin N. Saari, W. Casan Scott, Bryan W. Brooks*

Anthropogenic activities and climate change have resulted in a global increase in the occurrence of harmful algae blooms (HABs). *Prymnesium parvum* is an invasive toxin producing haptophyte commonly referred to as “golden algae” or the “Texas Tide” that forms HABs leading to massive fish kills. Though we have made progress understanding factors leading to ambient toxicity associated with bloom development and termination, an understanding of how *P. parvum* may affect fish sublethally (e.g., compromises to surviving fish) is not available. In the present study we aimed: (1) to determine if sublethal biochemical and molecular oxidative stress (OS) responses occur after exposure to *P. parvum* cultures; (2) to determine if sublethal OS responses are altered by nutrient limitation; and (3) to compare whether OS responses varied between two common fish species, the fathead minnow (*Pimephales promelas*) and zebrafish (*Danio rerio*), following standard aquatic toxicology approaches. *P. parvum* cultures were grown until stationary phase was reached under nutrient sufficient (f/2) and deficient (f/8) conditions following methods previously reported by our group. Initial studies were conducted to identify acute LC_{50} values for fathead minnow and zebrafish prior to and following exponential growth. Sublethal concentrations of both *P. parvum* cultures were used to examine traditional biomarkers of OS (lipid peroxidation, DNA damage, total glutathione), and antioxidant gene activation (changes in *nrf2*, *gclc*, *gst*, *sod*) in fish larvae. To our knowledge, this study represents the first attempt to understand mechanistic toxicity responses in general and oxidative stress in particular of fish to *P. parvum*.

ABSTRACTS FOR PLATFORM SESSION

Effects of Emerging Contaminants at Trace Level on Nitric Oxide (NO) Levels and Superoxidedismutase (SOD) Activity in Mice: Role of Sex and PPARα

***Pavani Gonnabathula**, Momoh A Yakubu,*

Toxicological effects of traditional water contaminants such as lead and arsenic are well known. Recently, trace amounts of chemical pollutants such as pharmaceuticals, personal care products, pesticides, herbicides and endocrine disrupting compounds are detected in our drinking water. These trace chemical pollutants pose environmental and human health concerns. So, we have investigated the effects of trace concentrations of multiple pesticides (MP) on the regulation of NO signaling molecule levels and SOD activity in the tissues from wild type and PPARα knockout mice. Wild type/ PPARα knockout mice (male and female) were exposed to trace concentrations of multiple pesticides comprising atrazine, dieldrin, endrin, endosulfan and anthracene (1- 100ng/L) in drinking water for six weeks. Blood and organs were collected, homogenized and NO levels and SOD activity were determined by Griess/SOD assays. In the blood samples, treatment with low MP reduced NO (20%) in the female with no change in the male. NO level was 90% higher in wild type compared to PPARα knockout female. NO levels increased in tissues from wild type: spleen (80%), heart (75%), liver (80%), kidney (85%) and brain (85%), while in PPARα knockout NO levels was reduced in spleen (45%) but increased in the kidney (55%) with no change in the brain, liver, and heart. In the male, NO levels were reduced in the heart (66%) and liver (40%) with no change in the kidney, spleen, brain, and testicles. Blood SOD activity is 90% greater in male than female; MP attenuated SOD activity by 20% with no change in the female. Female tissue SOD activity was significantly reduced in the heart (30%), liver (25%) and spleen (25%) of treated mice with no effect in the brain and the kidney. In the PPARα knockout mice, SOD activity was significantly increased in the heart (50%) and liver (25%) but not in the kidney, spleen, and brain. Thus, low concentrations of multiple pesticides caused selective dysregulation of NO/SOD systems in different organs of the body. The effects observed was sex dependent and may be influenced by genetic status as in PPARα knockout. These results present a scenario that implicates nano levels of series of organic contaminants that can cause cellular and molecular dysregulations of biomolecules precipitating toxicity and pathology that can be a threat to human health. Further investigation into the molecular mechanism(s) and signaling pathway(s) implicated in these dysregulations is warranted and is of interest.

Lethality of Crude Oil on *Lepidophthalmus Louisianensis* at Various Life Stages

***Alex Kascak**, Paul L. Klerks*

Lepidophthalmus louisianensis, commonly known as the ghost shrimp, lives along the northern coast of the Gulf of Mexico (GoM) in subtidal and intertidal areas. This species creates burrows that can reach depths greater than two meters. These burrows will connect below the sediment surface and create a large network. The presence of the shrimp and their burrow structures alters abiotic and biotic factors, allowing the shrimp to have a large impact on the area. Living on the coast in the GoM means that this species is at risk for crude oil exposure due to an oil spill as happened in 2010 due to the Mancondo well blowout. Experiments are being conducted on adult and larval individuals to assess the lethality of the crude oil. Experiments are conducted within environmental chambers to control light and temperature. Adult shrimp are exposed individually within microcosms to crude oil applied at the surface; larval shrimp are exposed in groups within glass beakers to the water-accomodated fraction (WAF). Toxicity tests are short as they are intended to determine acute toxicity. Preliminary results for larval survival of the zoea and decapodid life stages show a much greater resistance to WAF at the decapodid life stage, as well as a significant positive correlation between WAF concentration and time till death for both stages. Adult resistance is currently being assessed; results will be presented at the conference.

Cardiovascular Metrics as Sublethal Endpoints for the Fish Embryo Toxicity Test

***Julie C Krzykwa**, Alexis Olivias, Marlo K. Jeffries*

The United States requires that whole effluent and chemicals be tested for aquatic toxicity using the fathead minnow larval growth and survival (LGS) test. While the LGS test has been effective for determining acute and chronic aquatic toxicity, a fathead minnow fish embryo toxicity (FET) test has been proposed as a refinement to the LGS as younger organisms are thought to experience less stress during toxicant exposure. Presently, the FET test protocol does not include endpoints that allow for the prediction of non-lethal adverse outcomes or chronic toxicity. This limits its utility relative to other test types. This study investigated the utility of sublethal endpoints related to cardiovascular function and development (*e.g.*, heart rate, pericardial area, and cardiovascular related genes) as additional FET test metrics. FET tests were run with four model toxicants: 3,4 –dichloroaniline, sodium chloride, cadmium, and triclosan. Heart rate was evaluated at 76 hpf, while pericardial area was assessed at 120 hpf. Hatched larvae were sampled at the conclusion of the tests (120hpf) for gene expression analysis. Pericardial area was identified as the most sensitive sub-lethal endpoint, although alterations were also seen in the other metrics investigated. These alterations suggest that sublethal endpoints related to cardiovascular function and morphology may be useful for estimating non-lethal adverse effects and chronic toxicity. Future studies aimed at linking alterations in these endpoints to longer term adverse impacts are needed to fully describe the predictive power of these metrics in whole effluent and chemical toxicity testing.

ABSTRACTS FOR PLATFORM SESSION

Uptake of Several Short and Long-chain Perfluorinated Compounds (PFCs) by Carrots (*Daucus Carota*), Cadishes (*Raphanus Sativus*), Alfalfa (*Medicago Sativa*), and Tomato (*Solanum Lycopersicum*) Grown in Soils Containing Different Organic Carbon Content

***Steven Lasee**, Seenivasan Subbiah, William Thompson, Paxton Payton, Todd A. Anderson*

Perfluorinated compounds (PFCs) are incredibly stable environmental contaminants. In 2014, the United States Environmental Protection Agency labeled perfluorooctanoic acid and perfluorooctanesulfonic acid, the most persistent and toxic PFCs, as emerging contaminants due to their persistence in the environment. Data from animal studies on perfluorinated compounds indicate that they can cause several types of tumors, neonatal death, and may have toxic effects on the immune, liver, and endocrine systems. While many studies have evaluated the fate of PFCs in aquatic environments, the objective of this study was to determine PFC levels taken up by vegetation under a maximum availability scenario for a terrestrial environment. We grew carrots (*Daucus carota*), radishes (*Raphanus sativus*), alfalfa (*Medicago sativa*), and Tomato (*Solanum lycopersicum*) in laboratory grade sand, potting soil, and a 1:4 potting soil:sand mix. Sand was chosen due to its low organic carbon content making PFC bioavailability highest. The soils were spiked with 100 ng/g (100 ppb) of perfluorooctanoic acid, perfluorooctanesulfonic acid, perfluorohexanesulfonic acid, perfluorobutanesulfonic acid, perfluorononanoic acid, or perfluoroheptanoic acid; six PFCs that are currently or previously used in manufacturing and vary in chemical chain length. The plants were watered as needed with nutrient solution and allowed to mature (roughly 60 d). PFC concentrations in mature plant tissue were determined by LC-MS in an effort to calculate root, stem, leaf, and seed/fruit bioconcentration factors under this scenario.

Preparation and Study of Low-resistance Polyacrylonitrile Nano Membranes for $PM_{2.5}$ Clean Pp

***Lihua Lou**, Hongnan Zhang, Seshadri Ramkumar, Xiaohong Qin*

Particulate matter (PM), especially PM2.5, not only leads to serious air pollution, but also have been ranked by the World Health Organization as the 13th leading cause of mortality worldwide. Nanofiber membranes have small pore size, small fiber diameter, high filtration efficiency, which has been estimated as a possible effective method to solve this problem. However, with a pressure drop of up to 1500 Pa and production rate of 0.04 g/h make it less likely to be used as commercial products. In this paper, patterned nanofiber membranes with large pore size were fabricated to adjust the pressure drop and filtration efficiency. Polyacrylonitrile was employed as the electrospinning material as it is a common and fluffy fiber. Structured receiving templates and cylinder were served as collector to prepare the patterned membranes. A needleless electrospinning method with a production rate of 20-25 g/h was used to produce nanofiber membranes. With the special structure, the pressure drop of nanofiber membranes significantly declined from 1500 Pa to about 150 Pa, with the filtration efficiency a slight decline from 99.94% to about 98% compared to traditional electrospinning nanofiber membranes. These sharp declines of the pressure drop while retaining the filtration efficiency make it an excellent filter for air pollution.

Assessing Vision in Sheepshead Minnow Following Oil Exposure

***Jason Magnuson**, Aaron Roberts*

During the Deepwater Horizon spill millions of barrels of oil were released into the Gulf of Mexico at peak spawning periods of estuarine fishes, including the sheepshead minnow (Cyprinodon variegatus). Developmental abnormalities have been shown to result from polycyclic aromatic hydrocarbons present in the oil, and could impact the vision of these fish. In this study, larval sheepshead minnow, ranging from 4 day post hatch (dph) to 6 dph, were assessed for visual function using the flicker fusion principle to monitor an optomotor response. Embryonic sheepsheads were exposed to high energy water accommodated fractions of weathered oil and optomotor response was determined. Visual acuity in larval sheepshead was significantly reduced following exposure to oil. Retinal layers were observed histologically to determine changes in eye morphology throughout development and oil exposure. The results of this study provide information on visual and behavioral impacts of oil on fish vision.

ABSTRACTS FOR POSTER PRESENTION

23. Bombax Ceiba: A Potential Source of Biodiesel Production

***Theresa Jibunor**, Kevin Anthony, Duma Hlangothi, Mahmoud A. Saleh*

This study, focus on the use of Bombax Ceiba seed oil as a potential source for biodiesel production. Due to the heavy reliance of fossil fuel, the gradual shift to biodiesel is imperative. Recently, biodiesel production has been focused on traditional seed oils such sesame seed, sunflower seed, oil palm etc. The objective of this research was aimed at describing the physical and chemical properties of the seed oil, techniques used to analyze extraction yield and investigate the viability of the biodiesel produced from Bombax Ceiba. The different extraction techniques used were: Soxhlet Extraction, Percolation, Ultrasound Extraction, Microwave Assisted Extraction and Supercritical Fluid Extraction. The different extraction were used to determine percentage yield. The samples were analyzed using HPTLC (High Performance Thin Layer Chromatograph) for separation of chemical mixture, GC-MS (Gas Chromatograph-Mass Spectrometer), GC-FID (Gas Chromatograph-Flame Ionization Detector), and GC-IR (Gas Chromatograph- Infrared Spectrometer) for Fatty Acid Methyl Esters analysis, IR (Infrared radiation) for functional group identification and HPLC-MS (High Performance Liquid Chromatograph- Mass Spectrometer) for triglyceride analysis. The acid- catalyzed reaction (H_2SO_4 and BF_3) was compared with the base-catalyzed reaction (KOH). The results obtained suggested that the Bombax Ceiba seed oil is rich in unsaturated fatty acids, the major components of unsaturated fatty acids are Linoleic (C18:2), Oleic (C18:1) and the saturated fatty acids are Stearic (C18:0) and Palmitic (C16:0). The Percolation technique was found to produce a higher yield, however the microwave assisted technique is considered a better extraction method based on the solvent amount used and the time required.

24. Determination of Polycyclic Aromatic Hydrocarbons in Roasted Coffee

***Angelica D. Jimenez**, Afolabi Adisa, Cara Woodham, Mahmoud A. Saleh*

The presence of Polycyclic Aromatic Hydrocarbons (PAHs) in environmental samples such as water, sediments, and particulate air has been extensively studied, but food samples have received less attention. The objective of this research was to identify and determine the concentration of PAHs in light, medium, and dark roasted coffee including instant and decaffeinated brands. PAHs are toxic compounds that are suspected to be carcinogenic or procarcinogenic. Total PAHs concentration was related to the degree of roasting with light roasted coffee showing the least and dark roasted coffee showing the highest level. Both instant and decaffeinated coffee brands showed lower levels of PAHs. Naphthalene, acenaphthylene, pyrene, and chrysene were the most abundant individual isomers. The concentrations ranged from 0 to 561 ng/g for naphthalene, 1 to 512 ng/g for acenaphthylene, 60 to 459 ng/g for pyrene, and 56 to 371 ng/g for chrysene. Intensive food or beverage studies can help determine the amount of PAHs present in the food or beverage intake per item. Thus, for coffee beverages, the roasting conditions should be controlled to avoid the formation of PAHs due to their suspected carcinogenic and mutagenic properties.

25. Trace Elements in Wild and Captive Hawaiian Green Sea Turtles (*Chelonia Mydas*)

***Katherine Shaw**, Jennifer Lynch, George Balazs, Todd Jones, Jeff Pawloski, Marc Rice, David Klein*

The Hawaiian subpopulation of green sea turtles is listed as threatened under the Endangered Species Act of 1973, and is protected by international laws. Increasing evidence suggests exposure to toxic metals decreases immune function and leads to development of fibropapillomatosis, a disease that causes tumor formation on soft tissues. Due to their protected status, non-invasive sample collection methods are required for contaminant measurements. Blood provides a good representation of recent exposure, while scutes (keratin comprising the turtle shell) indicate long term exposure. This study compares green sea turtles in captivity at Sea Life Park in Oahu, Hawaii, to wild green sea turtles around the Hawaiian Islands. Blood and scute samples from six green turtles at Sea Life Park and nine wild green turtles were selected from the NIST Marine Environmental Specimen Bank and are being analyzed by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS). Metals of interest include: Hg, Cd, Pb, As, V, Ni, Cr, Ba, Ti, Al, Cu, Mn, Se, Sr, Ag, Sn, Fe, and Co. This is the first study to compare metals in captive sea turtles to wild green sea turtles. This small sample set will provide a baseline on the health of green sea turtles in captivity in comparison to wild green sea turtles and provide a baseline for which to compare wild turtles.

ABSTRACTS FOR POSTER PRESENTION

19. Distribution of Silymarin in the Fruit of *Silybum Marianum L.*

Duma Hlangothi, *Fawzia Abdel-Rahman, Thao Nguyen, Kevin Anthony, Mahmoud A Saleh*

The fruit of *Silybum marianum* or milk thistle is known for its rich contents of flavonlignan compounds known as silymarin. Silymarin has been recognized for centuries as "liver tonics" and is well known to prevent or reverse hepatotoxicity. Silymarin is usually extracted from the defatted fruits in methanol in a yield of less than 2%. Fluorescent microscopy, scanning electron microscopy, accurate mass spectrometry as well as infra-red and Raman spectroscopy were used for mapping silymarin in the fruit. Silymarin was found to be only located in the pericarp section of the fruit. Extraction of silymarin from the pericarp gave higher yields of more than 6% and did not require defatting.

20. Quantifying Microplastic Debris From 3 Corpus Christi, TX Wastewater Treatment Plants

Kelli Holt, *Jeremy L. Conkle*

Microplastics are found in waters all over the world in surface waters and in the oceans, where is there a concern for their impacts to ecosystem health. A major source of the plastics is treated wastewater effluent. Wastewater treatment plants are not designed to remove microplastics, so microbeads and synthetic fibers are regularly found in the receiving basins where they can be consumed by aquatic/marine species and pose a multitude of problems. Wastewater effluent samples were collected at three municipal wastewater treatment plants in Corpus Christi, Texas. Three samples of approximately 2.5 L were taken from each plant at the same time of day each trip. Samples were sieved into 3 size classes: 1000 micrometers, 300 micrometers, and 50 micrometers. Wet peroxide oxidation was used to remove organic matter and materials were manually sorted using a stereomicroscope.

21. Distribution of Heavy Metals in Bank Soils of Brays and Sims Bayou Watersheds in Houston, TX

Habibur Howlider, *Maruthi Sridhar Bhaskar*

The accumulation of trace metals in soil is a serious environmental problem that creates a hazard when metals are transferred to water or plants and also harmful for human health. A total of 48 bank soil samples were collected from upper and lower creek of Brays Bayou and Sims Bayou watersheds within Harris County, Houston in Spring, 2016 to analyze the heavy metal concentrations. The soil samples were air dried and then sieved to 2mm in size. The objectives of this study was to analyze and compare the heavy metal (Hg, As, Pb, Cr, Mg, Mn, Cu, Sr, Ba, Mo, Zn) concentration in soil samples within Brays Bayou and Sims Bayou watersheds. The concentration of heavy metals in soils were conducted by microwave digestion technique followed inductively coupled plasma mass spectrometry (ICP-MS). A complete digestion of soils was achieved by following EPA 3051A method which includes digestion of 0.5 gm soil with 10 ml of concentrated HNO_3. The results from the metal analysis showed that the Hg and As were both present in lower amounts at most of the locations of Brays and Sims Bayou watersheds. The Cr concentration was below detection limit in Brays Bayou soil samples but present in a least amount at lower creeks of Sims Bayou. The Pb concentration is higher compared to other heavy metals found in lower creek of Brays Bayou and Sims Bayou watersheds while Zn, Mg, Sr and Ba were present in a significant amount compared to other elements.

22. Comparison of Heavy Metals in Oysters from Three Reef Restoration Designs in West Galveston Bay, Texas

Korry J. Huddleston, *Cindy Howard*

Oyster reef restoration construction has become common along the southern United States coastlines. Few studies, however, compare the effects the binding substrate has on metal concentrations in oysters. This study explores the effects of three different designs constructed in the West Galveston Bay area, by comparing heavy metal concentrations in oyster tissue. Samples were analyzed for Pb, Zn, As, Cd, Cu, and Fe for this study. Samples were digested and analyzed by ICP analysis. This project aims to assist future restoration projects when determining the most beneficial design in terms of organism health. Results will be discussed during the poster presentation.

ABSTRACTS FOR PLATFORM SESSION

Extraction Method Validation and Stability of Neonicotinoids in Water

Michelle M. McManus, *Subbiah Seenivasan, Jaclyn E. Cañas-Carrell*

Neonicotinoids are systemic, broad spectrum insecticides commonly used in agriculture. Exposure of non-target aquatic species to neonicotinoids has become an increasing concern given the high solubility of this pesticide class. Researchers are concerned about the potential underestimation of contamination of surface waters. Given the potential underestimation and risk to aquatic organisms, it is important to understand the impact of water components on the extraction efficiency and stability of three common neonicotinoids, clothianidin (CLO), imidacloprid (IMI), and thiamethoxam (TMX). To investigate this, three studies were conducted: 1) Solid phase extraction (SPE) efficiency of commonly used cartridges 2) stability of neonicotinoid samples both prior to and after extraction, and 3) analysis of field samples using the results of the first two studies. Two SPE cartridges were tested, C18 and Oasis HLB. Two-way ANOVA was used to assess the impact of dissolved organic carbon (DOC) and pH on percent recovery using C18 cartridges. The recovery of CLO, IMI, and TMX was significantly impacted by DOC but not pH ($p<0.05$). No effect on extraction efficiency was observed when using HLB cartridges. Neonicotinoids were stable in simulated field water for nine days at 4 °C ($p>0.05$). Ongoing studies will confirm the effect of DOC on extraction using C18 cartridges and storage stability of neonicotinoids using spiked field water.

Paradoxical Regulation of Human Lung Adenocarcinoma Cells Line (H1299) Proliferation by Ethanol Xxtract of Hydnora Johannis Becc (*Kausen Kasa*) Mediated by Estrogen Receptor/ EGFR and PKC Activating Pathways

Mounira O. Morgem, *Momho A.Yakubu*

Extract of Hydnora Johannis Becc (*Kausen Kasa*) found in Africa, Asia, and Central America used for the treatment of several conditions including diarrhea, inflammation, infertility and post-menopausal symptoms. We have investigated the effect of Kausen Kasa on the proliferation of H1299. Cells were plated in 96 well plates and effects of Kausen Kasa were evaluated using MTT assay. Treatment of H1299 with Kausen Kasa for 24 hr. induced a dose dependent increase in cell proliferation, increasing growth by 165%, 188%, 203%, 214% and 263% at 0.1, 0.25, 0.5, 1 and 2 mg/mL compared to the control. Paradoxically, the proliferative effects of the extract were turned into an antiproliferative effects at 48 hr. treatment reducing the cell growth to -74%, -65%, -37%, -17%, and 108% for 0.1, 0.25, 0.5, 1 and 2 mg/mL, compared to the control. To investigate the pathways and mechanisms by which Kausen Kasa regulate H1299 cell growth, cells were treated with Kausen Kasa 0.1 – 2 mg/mL in the presence or absence of estrogen receptor inhibitor Tamoxifen (10µg/mL), EGFR inhibitor (Tyrphostine, 5 µM), Protein Kinase C inhibitor (Calphostine C, 5 µM) and effects on cell proliferation was determined. Tamoxifen, Tyrphostine, and Calphostin C significantly attenuated proliferative actions of Kausen Kasa treatment at 24 hr. The antiproliferative effects observed 48 hr. following Kausen Kasa alone was reverted to proliferation in the presence of these inhibitors. These results suggest that Kausen Kasa can activate both proliferative and apoptotic signaling pathways in H1299 cell line through activation of ER/EGFR and PKC activating pathways. Our results call for further investigations to determine the downstream and possible transcription factors involved in this paradoxical action.

Mercury Contamination of Seven Families of Shoreline Spiders and Possible Risk to Arachnivorous Songbirds

Celeste Ortega-Rodriguez, *Matt Chumchal, Ray Drenner, James Kennedy, MacGregor Hall, Kyle Lauck, Kirkland Polk, Edward Williams*

Mercury (Hg) is a hazardous contaminant that can be transferred from aquatic to terrestrial environments by emerging aquatic insects. Terrestrial predators, such as spiders, that live along shorelines of water bodies may consume emerging aquatic insects and become contaminated with Hg. Mercury-contaminated spiders may pose a risk to arachnivorous songbirds. The degree to which most families of spiders are contaminated with Hg and the risk they pose to songbirds is not well understood. The objectives of this study were to determine 1) Hg concentrations in seven families of shoreline spiders, 2) if each family was connected to the aquatic food web via the consumption of emergent insects and 3) determine the risk these spiders pose to arachnivorous birds. We collected representatives from seven families of spiders along with a variety of aquatic and terrestrial plant, invertebrate, and fish samples from 10 ponds located in north Texas, USA. We used methylmercury (MeHg) concentrations in combination with stable isotopes of nitrogen ($\delta 15N$) to determine if each family of shoreline spider was connected to the aquatic food web. All spider taxa in the present study were contaminated with Hg and connected to the aquatic food chain. We calculated wildlife values for various songbirds to determine health risks that Hg-contaminated spiders may pose to songbirds. Spider based wildlife values revealed that six of the seven families of shoreline spiders examined had concentrations of MeHg high enough that they may pose a risk to arachnivorous songbirds that forage for spiders along shorelines of ponds.

ABSTRACTS FOR PLATFORM SESSION

Evolution to Pollution in Gulf Killifish (*Fundulus Grandis*) from Galveston Bay, Texas, USA

***Elias Oziolor**, Noah Reid, Benjamin Dubansky, Sarah Guberman, Kimberly Young, Zachary Winfield, Jennifer Apell, Lissette Aguilar, Jeffrey Back, Phillip Gschwend, Warren Berggren, Sascha Usenko, Joseph Shaw, Andrew Whitehead, Cole Matson*

Anthropogenic contamination associated with industrial activity is a widespread and active threat to the stability of organisms. The Houston Ship Channel (HSC) is one example of a heavily impacted environment, where industrial activity has contributed to extreme levels of pollution with various classes of contaminants, such as polychlorinated dibenzo-*p*-dioxins and furans (PCDD/Fs), polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). This dissertation studies the impacts of chronic multi-generational exposure to industrial contamination on the population structure, resistance and demography in a keystone coastal species – Gulf killifish (*Fundulus grandis*). We have characterized their sensitivity to contaminants in populations from 12 locations across Galveston Bay, as well as the contamination levels at those sites. We found a gradient of resistance that was positively correlated with contaminant concentrations. This resistance was also correlated to a suppression of the aryl hydrocarbon receptor pathway (AHR), as estimated via the activity of a down-stream regulated enzyme – cytochrome P450 1A (CYP1A). To better understand the impacts of this adaptation, we evaluated the cross-resistance and fitness cost of populations to mechanistically and environmentally relevant stressors, but we were unable to confirm any fitness costs. We showed that the heritability of this resistance is biparental and multi-generational, which suggest that this is a genetic trait. Finally, we performed a full genome resequencing of seven populations along this gradient of resistance and discovered that genomic regions under selection in adapted populations included the AHR pathway. Here we show the specific genetic changes that have allowed Gulf killifish to adapt to anthropogenic contamination in the HSC.

Risk to Pollinators Posed by Agrochemical Mixtures Emitted From Feed Yards

***Eric M. Peterson**, Kimberly J. Wooten, Seenivasan Subbiah, Todd A. Anderson, Scott Longing, Philip N. Smith*

Insect pollinator populations are declining across the United States. Potential causes of observed declines in insect pollinators include, but are not limited to, reduced wildflower availability, monoculture agriculture, parasites, diseases, malnutrition, and pesticides. Livestock production, specifically beef cattle feed yards, use a variety of veterinary pharmaceuticals and pesticides to enhance growth and health of cattle, and to control unwanted pests and parasites. Since growth promoters and antibiotics have recently been detected on particulate matter emanating from feed yards, we examined wildflowers and insect pollinators near feed yards in the Southern High Plains for occurrence of antibiotics, beta-agonists, other feed yard-related agrochemicals (avermectins), and neonicotinoids. All wildflower samples contained at least one target analyte, while the majority (82%) contained multiple pharmaceuticals/pesticides including 12% of wildflowers containing antibiotics, ractopamine, moxidectin, and a neonicotinoid. This demonstrates the potential for insect pollinators occurring near feed yards to become exposed to mixtures of feed yard-derived agrochemicals as well as pesticides used on nearby row crops.

Analysis of Incense by Headspace-gas Chromatograph-mass Spectrometer (HS-GC-MS) and Thermogravimetric-Gas Chromatograph-mass Spectrometer (TGA-GC-MS)

***Mitchell Schnyder,** Mahmoud A. Saleh*

Twelve incense samples, six stick incense and six droop style, from four different manufacturers were characterized by headspace-gas chromatography/mass spectrometry (HS-GC/MS) and thermogravimetric analysis-gas chromatography/mass spectrometry (TGA-GC/MS) under pyrolysis conditions. Burning incense is a popular practice around the world across all races, religions, ethnicities, nationalities, and ideologies. There are numerous studies which show the chemical composition of incense before burning or after burning. However, there are few studies that investigate the chemical composition both before burning and after burning. A chemical fingerprint for the incense before burning was determined using HS-GC/MS and many hazardous compounds were found. The TGA-GC/MS was used to determine the products of pyrolysis and combustion under helium and oxygen atmospheres respectively. The TGA-GC/MS analysis showed the presence of benzene for four out of six samples and the different chemical compositions of incense after thermo gravimetric analysis were suspected to be a result of distinct smoke-generating compounds used in the manufacturing of incense. This research provides preliminary evidence on the harmful emission products and their relationship to certain materials used in incense.

ABSTRACTS FOR POSTER PRESENTION

16. Identification of Hypoxic Genes Induced in Non-Cancer Lung Cells After Exposure to Platinum Group Metal Salts

***Nkem Azu**, Selina Hernandez, Ammrutha Immadi, Shishir Shishodia*

The Platinum Group Metals (PGM), platinum (Pt), Palladium (Pd), and Rhodium (Rh) are released from automobile catalytic converters in the form of nano-sized particles. Significant concentrations of rhodium, palladium, and platinum have been previously reported in tunnel dusts and surface road dusts. Humans can be exposed to these metals through inhalation of airborne particulate matter (PM) that may provoke respiratory diseases and other adverse effects. Exposure to atmospheric PM is known to induce many respiratory diseases especially in susceptible populations such as children. Platinum like other transition metals exist in several different forms having different oxidation states and are chemically inert. Hypoxia is suggested to drive pathophysiological lung processes in infant lung, pulmonary hypertension, asthma and chronic obstructive pulmonary disease. However, very little is known about the mechanism in which environmental contaminants like PGMs have on pulmonary function. We hypothesized that exposure to PGM will affect the hypoxia pathway which is essential in the development of pulmonary diseases. To test this hypothesis, we examined the expression of 80 different hypoxia genes using real-time PCR in non-cancer lung cells exposed to platinum group metals and compared expression in lung cells not exposed to PGM salts. In the present study, we demonstrate mRNA level PGM salt stimulation led to an induction of the positive acute phase genes alpha 1-antitrypsin (SERPINA1), TLR2 (Toll-like receptor 2), ADAM17 (A disintegrin and metalloproteinase 17), EGLN3 (hypoxia-inducible factor prolyl hydroxylase), PRKCB (protein kinase C beta), PRKCD (protein kinase C delta), and PGF (placental growth factor). All of which have been implicated in the development of asthma and COPD. To our knowledge, links between PGM exposure and potential development of pulmonary diseases has not been reported. Future studies will be directed towards understanding the hypoxic response induced following road dust exposure.

17. Impact of Dust Exposure on Mixed Bacterial Cultures and During Eukaryotic Cell Co-Culture Infections

***Mariam Bado,** Jason A. Rosenzweig*

On a daily basis, humans, and their colonizing microbiome, are exposed to both indoor and outdoor-dust, containing both deleterious organic and inorganic contaminants, through dermal contact, inhalation, and ingestion. Recent studies evaluating the dust-exposure responses of opportunistic pathogens, such as *Escherichia coli*, *Enterococcus faecalis*, and *Pseudomonas aeruginosa,* revealed significant increases in biofilm formation following dust exposure. Dust is able to trigger important changes within the body, depending on its sources and nature of its components. Based on previous study, dust induced significant increases in biofilm formation in pathogenic opportunistic bacteria that associate with the gut microbiome. In this study, the effects of dust exposure on mixed bacterial cultures as well as HT-29 co-cultures were evaluated, more closely emulating the interactions taking place in the human gut following dust ingestion. As it was observed in pure, single bacterial cultures earlier, neither indoor- nor outdoor-dust exposure (at concentrations of 100µg/mL), influenced the growth of mixed bacterial liquid cultures. However, when in paired mixed-cultures, dust exposure increased sensitivity to oxidative stress as well as significantly enhanced biofilm formation (outdoor dust). Finally, bacterial proliferation during a eukaryotic cell co-culture was less robust than pure bacterial culture proliferation during exposure to dust. Taken together, our findings demonstrate that bacteria respond to dust exposure differently when in the presence of multiple bacterial species or when in the presence of human gut epithelial cells, then when grown in isolation.

18. Mercury in Mud Dauber Wasps on the Trinity River in Fort Worth, TX

***Madeline Hannappel**, Ray W. Drenner, Matthew M. Chumchal, James Kennedy*

Mercury (Hg) is a highly toxic environmental contaminant found in all waterbodies on earth. Emergent aquatic insects (like mosquitoes) transfer Hg from the aquatic systems to terrestrial consumers such as spiders. The objective of this study was to examine Hg concentrations in larval mud daubers (*Sceliphron caementrium*) and their spider prey in mud dauber nests. Adult mud daubers capture spiders with a paralyzing sting to use as the food source for the larvae in their nest. I collected 350 mud dauber nests from three bridges on the Trinity River and one building 40 m inland from the Trinity River in Fort Worth, TX. The nests contained 74 mud dauber larvae and over 2,000 spiders of five different families. I used a Direct Mercury Analyzer to determine the total Hg concentrations of mud dauber larvae and five spider taxa. All mud dauber larva and spiders were contaminated with Hg. The inland site had the lowest concentration of Hg in the spiders, suggesting that the spiders at this site were more reliant on low Hg terrestrial prey than high Hg aquatic prey. This is the first study to demonstrate that mud daubers nesting along river systems are part of the mercury cycle because of their use of shoreline spiders as prey for their larvae.

ABSTRACTS FOR POSTER PRESENTION

13. Effects of Inorganic Arsenic and BHT/BHA on P53 and MARK Pathway in BEAS-2B Cell

Vidyakiran Polaki, *Admola D. Adejayan, Hoda Etlayab, Shodimu-Emmanuel Olufemi, Desirée A. Jackson,*

Arsenic is a major environmental contaminant and a major health concern. It exists in both organic and inorganic forms. Inorganic arsenic As_2O_3 and $NaAs_2O_3$ are toxic and implicated in cancer development. This study revealed that antioxidants, butylated hydroxytoluene (BHT) and butylatedhydroxy anisole (BHA) ameliorate the effects of arsenic if administered after exposure to arsenic in BEAS-2B cells. BEAS-2B cells were cultured and treated with As_2O_3 or $NaAs_2O_3$ or combinations of inorganic arsenic and BHT/BHA at different dose concentrations, including mock controls. In BEAS-2B cells, the effects of sodium arsenite and arsenic trioxide on p53 and MAPK pathways, as well as the ameliorate effects of BHT/BHA on arsenic, were studied. The results were analyzed using Western blotting analysis. Cell death observed was higher at LD50 with 5 μM of As_2O_3 and 10 μM of $NaAs_2O_3$. Prior treatment with BHT/BHA was not protective. Treatment of the cells with either As_2O_3 or $NaAs_2O_3$ followed by BHT/BHA was protective. Results from this study showed activation of p53 and MAPK pathways and in the arsenic 24 h treated cells followed by 24 h BHA/BHT treatment, there was up-regulation of Caspase 3, Bax and C-raf. In $NaAs_2O_3$ 24 h treated cells followed by BHT/BHA for 24 h, GADD45 was upregulated, but mock controls showed downregulation. In the $NaAs_2O_3$ 48 h treated cells, downregulation of GADD45 was absent. The findings from this study suggested abrogation of p53 and MAPK pathways by treatment of arsenic alone, but prior arsenic treatment followed by BHA/BHT minimizing arsenic toxicity on the cells.

14. Raising the steaks: A pilot study on the effects of cattle-associated, hormonally-active compounds in Texas watersheds

Kyle Roush, *Marlo K. Jeffries*

Globally, there is demand for increased meat production. Texas, a leader in cattle production in the United States, has met this demand utilizing confined animal feeding operations (CAFOs) containing hundreds to thousands of cattle. To increase production efficiency, cattle receive growth-promoting hormone treatments to enhance growth and increase cattle mass. These hormonally-active compounds (HACs) have been found in cattle waste, feedlot runoff, and surface waters. The ultimate goal of this project was to identify watershed characteristics that promote the transport of cattle-associated HACs to surface waters. Therefore, the objectives of this pilot study were to: 1) identify and define a study area for evaluating HACs in Texas watersheds and 2) begin preliminary assessments of HAC activity in surface water downstream of cattle feedlots. A suitable study site was identified using satellite imagery, elevation data and the ArcGIS hydrology tool pack. Sample sites were selected within this area based on geographical features and position to CAFOs. Caged fish studies, followed by analysis of estrogen-responsive gene expression, were utilized to assess the presence and activity of HACs. Though no statistically significant alterations in estrogen-responsive gene expression metrics were observed, females from three of the four sites downstream of CAFOs experienced 2.9 to 3.7-fold and 1.9 to 5.3-fold decreases in the expression of estrogen receptor α and vitellogenin, respectively. This could have larger implications as previous research by Miller et al. (2007) forecasted that a 25% reduction in vitellogenin plasma concentration could result in up to a 70% decrease in population size.

15. Exposure to the model goitrogen, propylthiouracil (PTU), alters the immune response and pathogen resistance in male fathead minnows (*Pimephales promelas*)

Meriel C. LeSueur, ***Leah M. Thornton*** *Marlo K. Jeffries*

The sensitivity of the hypothalamic-pituitary-thyroid axis to environmental contaminants and the subsequent effects on growth and development has been well established for many endocrine-disrupting compounds. However, recent studies have suggested that thyroid hormones may play a role in the regulation of immune function. This study sought to determine the impact of propylthiouracil (PTU, a known thyroid inhibitor) on various aspects of immune function in the fathead minnow (*Pimephales promelas*). To achieve this, male fathead minnows were divided into two groups: a control and a PTU-exposed group. Following a 21 day exposure period, both groups were challenged with *Yersinia ruckeri* and mortality was monitored for 14 days to assess pathogen resistance. Tissues (*i.e.* liver, spleen and kidney) were sampled at 8 and 72 hours post injection (hpi) for the assessment of immune gene expression and spleen index. PTU exposed males experienced significant decreases (~20%) in survival following pathogen challenge relative to controls. In addition, PTU exposed males had significantly lower mean spleen index (~15%) than controls following injections, suggesting that they had a reduced ability to elicit an immune response. Though not statistically significant, a 1.9-fold decrease in interleukin 1β expression and a 2.3-fold increase in myeloperoxidase expression were observed in the hepatic tissue of PTU exposed males at 8 hpi relative to controls. These results demonstrate that chemically induced decreases in thyroid hormone levels can suppress immune function and that the immune system may be a target for thyroid disrupting chemicals.

ABSTRACTS FOR PLATFORM SESSION

Investigating the Effect of Excess Metals on Sediment Bacterial Communities in the Animas Watershed After the Gold King Mine Breach.

Kelsey N. Thompson, *Jeremy E. Wilkinson, Philip N. Smith, Gregory D. Mayer*

On August 5, 2015, a levee at the Gold King Mine was breached when EPA contractors attempted to add a tap to help abate acid mine water. As a result, the mine released approximately 3 million gallons of acid mine drainage into the Animas River Watershed. This caused increased concentrations of toxicants and changed water quality metrics. We hypothesized that the resulting selective pressure on bacterial communities would change community structures to comprise taxa that were better able to deal with metal and pH stress. We compared the contaminated sites to control sites of the Animas upstream of the confluence with Cement Creek, and the San Juan upstream of the confluence with the Animas. To study population diversity and structure of sediment-borne bacterial communities, we used 16S amplicon sequencing for bacterial taxonomic identification. We found that the three sample locations closest to the mine had decreased alpha and increased beta diversity when compared to all other samples in the Animas River Watershed. The most abundant bacteria in sediments closest to the mine was *Gallionella sp.*, an iron oxidizing species of bacteria. The change in water quality metrics affected the species of bacteria that were present in each sediment sample. Though loss of diversity in an ecosystem often limits the ability of an ecosystem to recover from further perturbations, sediment communities did shift towards bacteria that are better able to process excess iron and other metals in the acid mine drainage. Hopefully, this represents an important first step in ecosystem recovery.

Toxicity of Poly - and Per-fluorinated Compounds to Northern Bobwhite Quail

William Thompson, *Steve Lasse, Seenivasan Subbiah, Mike Wages, John Kasumba, Todd A. Anderson*

The purpose of this study is to determine toxicity reference values (TRVs) for birds for six per- and polyfluoroalkyl substances (PFAS) using Northern Bobwhite (*Colinus virginianus*) as a model species. PFAS are a class of chemicals characterized by long carbon chains surrounded with fluorine groups used for their hydrophobic and non-reactive properties in firefighting foam and other industrial applications. These compounds have been found to be both widespread and persistent in the environment; while these compounds have been found to accumulate in wildlife, the toxicity of these compounds are not well characterized for non-mammalian vertebrates, including birds. Our study examines the effects of acute oral exposure with six PFAS and the chronic effects of PFAS exposure on growth, development, and survival in Northern Bobwhite. Our acute study determined the LD50 using the "Up-and-Down" procedure to minimize number of animals needed in this study. The chronic portion of our study is currently just beginning but will assess toxicity using the survival of dosed adults and their chicks, egg production of breeding pairs, and the growth of chicks over a period of one month.

Green-based Incineration as a Remediation Option for Plastic Waste Pollution in Nigeria

Onyanobi Abel-Anyebe, *G.A. Ocheche*

Solid waste management is a major problem in Nigeria. Heaps of waste materials deface the cities. A large portion of this waste is made up of plastic materials which with other wastes are washed into water bodies and farmlands. In addition, indiscriminate dumping of waste materials has enormous negative impact on the environment, aquatic life and on the quality of life of the people in general. The solid waste dumps are also a breeding ground for mosquitoes and other disease vectors. The repulsive odor emanating from the waste dumps is also a source of discomfort for the teeming population. Inappropriate/inadequate technology is listed as some of the factors militating against proper solid waste management in Nigeria, and recycling of waste materials is rarely carried out. Incineration, as controversial as it is, might be the way forward. In the short run, it is the option to remediate this problem for the country. To this end an incinerator of simple design has been constructed, using locally available materials, and tested. Polythene waste materials were collected, incinerated and the gas evolved was channeled into various test reagents including the filtrate of the ash of plantain waste (peel) to capture carbon dioxide produced from incineration, thereby protecting the environment from pollution. Pre/post incineration pH analysis of the sample solutions was conducted. The combustion gas turned water weakly acidic and lime water milky. In each case, pH change was in the direction of higher acidity and the incinerator reduced polyethene waste volume significantly.

ABSTRACTS FOR POSTER PRESENTION

1. Effect of Zoledronic Acid the Transcriptome of Cell Lines Representing Triple Negative Compared and Luminal Breast Cancer

Nissi Abraham, *Audrey Player*

Zoledronic acid (ZA) is a biphosphanate and data appears to show the drug blocks multiple steps in tumor progression. Although, its precise mechanism of action is not known, data from clinical trials show the drug is more effective in treating TNBC compared to luminal patient samples. TNBC samples showed increased killing by ZA with potential targeting of genes involved in the inflammatory processes. The study represented here aims to expand upon previous studies with the ultimate goal of characterizing the transcriptome changes that occur with administration of ZA. However, as a preliminary study, we chose to (a) validate gene expression of a short panel of genes speculated to be ZA targets in efforts to support our selection of cell lines to study and (b) perform dose response experiments to establish the IC50 of our TNBC (i.e., MDA MB231 cells) compared to luminal (ie, MCF7 cells) following exposure to ZA. Preliminary results show that control TNBC expresses potential ZA targets compared to the luminal cell line, hence the cell lines are suitable for study, and the TNBC cell line appears to be more sensitive to killing by ZA compared to the luminal cell line, both observations consistent to that observed by other investigators. Our data suggest our model system is suitable for downs-stream analyses, one of which includes transcriptome analyses of ZA treated cell lines.

2. Evaluation of Anti-proliferation and Cytotoxic Effects of Jegeme Leaf Extract on Human Lung Adenocarcinoma Cell Line (H1299)

Toluwani O. Adebayo, *Momoh A. Yakubu*

Aqueous extract of herbal plant Jegeme is used in the treatment of psychosis which suggests the the possible effect on hormones and ligands that activate kinases and the regulation of cellular processes. Effects of methanolic extract of Jegeme on H1299, a lung cancer cell line's proliferation and cytotoxicity using the MTT assay in dose-dependent and time dependent treatment suppressed growth and survival of H1299 cell. Proliferation of H1299 was significantly attenuated by 12% (24hr.) and 69% (48hr.) for 0.5 mg/mL; 26% (24hr.) and 75% (48hr.) for 1mg/mL: 46% (24hr.) and 83% (48hr.) for 2 mg/mL. Significant inhibition also noted as such by 50%, 44%, and 52% at 24, 48, and 72-hours following treatment with 1mg/mL and 2mg/mL extract. Exposure to 0.5-2mg/mL Jegeme extract also inhibited H1299 as follows; 64%, 66% and 80% at 24, 48 and 72-hours respectively. Each concentration and H1299 was incubated in the presence or absence of PKC or PTK inhibitor, Calphostin C or Tyrphostine (5 micromolar) to investigate the possible involvement of Protein kinases in the mechanism by which Jegeme attenuates H1299. PKC nor PTK seemed to have significant effects on the antiproliferative or the cytotoxic effects of Jegeme. Our findings indicate that Jegeme leaf extract regulate H1299 non-small adenocarcinoma proliferation and survival and it has probable chemotherapuetic effects. However, further research is suggested to investigate the cellular and molecular mechanism(s) by which this extract interferes with proliferation of H1299 as well as to determine the active alkaloids in Jegeme extract.

3. Biological Effects of Low, Medium, and High Blue-enriched White Light-in Light Emitting Diode (LED) on *Caenorhabditis Elegans*

Aldana Aldawsari, *Fawzia Abdel-Rahman*

Caenorhabditis elegans (*C. elegans*) is small free-living and bacterial-feeder rhabditid nematode. It is a good model to study the effects of light emitting diode (LED) on the living systems because of its biological characteristics; such as short lifespan, easy maintenance in the laboratory; and it shares at least 70% of their genes with humans. It has offered many valuable insights into the field of human biological sciences. This study aims to analyze whether the chronic exposure of the nematode *C. elegans* to the blue-enriched white light in LED light from egg to adult can impact the biology and behavior of *C. elegans*. In this analysis, four treatments were prepared to evaluate these effects that were exposed to no light (dark) which is the control, low-blue enriched, medium-blue enriched and high blue enriched white in LED light sources. The results showed that the low-blue enriched treatment was very much similar to control. It was evident that in the medium-blue enriched, the worms showed significant biological differences; however, it was much higher in the high-blue LED exposed treatments. The reproduction was very low by day 6 with 68 total progeny in medium-blue LED; however, in high-blue enriched was much lower, 55 total progeny versus the control with 159 progeny. The findings of this study showed that blue enriched white LED light can decrease the reproduction, causes late hatching and development to adults, slow locomotion, less heat/cold tolerance, and induce generation of reactive oxygen species (ROS) on *C. elegans* that were developed under LED light.

ABSTRACTS FOR POSTER PRESENTION

10. Blood Cholinesterase (ChE) as a Biomarker to Monitor the Exposure of Northern Bobwhites (*Colinus Virginianus)* to Blood ChE Inhibiting Chemicals in the Rolling Plains Ecoregion of Texas and Oklahoma, USA

*Sara A. Pappas, Uday Turaga, Nicholas R. Dunham, **Naveen Kumar**, and Ronald J. Kendall*

In an effort to identify factors contributing to the population decline of Northern bobwhites (*Colinus virginianus*) in the Rolling Plains ecoregion of Texas and Oklahoma, blood samples were collected from quail during the summer (August) and fall (October) of 2013. The blood samples were analyzed using a spectroscopic method to quantify blood cholinesterase activity of the specimens, a biomarker of exposure to blood cholinesterase inhibiting chemicals. Significant differences in the blood cholinesterase activities of pen-raised and wild bobwhites were observed. More importantly, significant differences in the blood cholinesterase activities of bobwhites based on age were observed in the case of wild bobwhites. Additionally, juvenile male and female bobwhites in the wild were found to have a significantly higher blood cholinesterase activity compared to their adult male and female counterparts. A significant decrease in the blood cholinesterase activity of the wild bobwhites did reveal an exposure to blood cholinesterase inhibiting chemicals in the Rolling Plains ecoregion.

11. Immune Modulation in Normal Human Peripheral Blood Mononuclear Cells (PBMC'S) (Lymphocytes) in

Response to Benzofuran-2-Carboxylic Acid Derivative (KMEG) During Spaceflight

Elvis Okoro, *Ivory Ellis, Vivek Mann, Elvedina Mansoor, Loretta Olamigoke Karla Sue Marriott, Pamela Denkins, Willie Williams, Alamelu Sundaresan*

Microgravity and radiation exposure during space flight have been widely reported to induce the suppression of normal immune system function, and increase the risk of cancer development in humans. These findings pose a serious risk to manned space missions. Interestingly, recent studies have shown that benzofuran-2- carboxylic acid derivatives can inhibit the progression of some of these devastating effects on earth and in modeled microgravity. However, these studies had not assessed the impacts of benzofuran-2 - carboxylic acid and its derivatives on global gene expression under true spaceflight conditions. In this study, the ability of a specific benzofuran-2-carboxylic acid derivative (KMEG), to confer protection from radiation and restore normal immune function was investigated following exposure to true space flight conditions on the ISS. Normal human peripheral blood mononuclear cells (lymphocytes) untreated and treated with 10 µg/ml of KMEG were flown on Nanoracks hardware on Spacex-3 flight. Samples were returned a month later and were analyzed. A parallel ground control experiment was performed at Kennedy spaceflight center under similar conditions. Gene expression analysis was performed, using Illumina Total Prep RNA Amplification Kit The first overall subtractive unrestricted analysis revealed 78 genes which were differentially expressed in space flight untreated control lymphocytes as compared to ground control untreated lymphocytes. Further analysis revealed that the KMEG- treated space flight lymphocytes showed increased expression of a group of genes that mediate increased transcription, translation and innate immune system mediating functions of lymphocytes as compared to KMEG-untreated control samples in space flight ($P<0.001$). Overall, our analysis indicates that KMEG promotes proliferation and has an anti-inflammatory effect.

12. Predicting the Effect of Perfluorooctanic Acid on Loggerhead Sea Turtle Cells by Computational Model

Jocylin D. Pierro, *Angela L. Peace, Sarah J. Webb, Céline A.J. Godard-Codding*

Little toxicological research has been conducted on endangered loggerhead sea turtles (Caretta caretta). In this study, targeted in vitro viability data was collected from loggerhead skin cells exposed to perfluorooctanic acid (PFOA). PFOA is a known marine contaminant with documented detrimental effects in reptiles and tissue burdens in loggerheads. Data collected parameterizes a toxicokinetic and toxicodynamic (TKTD) model called the General Unified Threshold model of Survival (GUTS). TKTD modeling has two modeling approaches for survival: stochastic death (SD) and individual tolerance (IT). In SD models one toxic concentration threshold is identical for all individuals. When the internal concentration in the organism exceeds this threshold, the predicted survival decreases equally among individuals. IT models are taking into account inter-individual sensibility to toxicants, where the response to the stressor varies among individuals. GUTS models are novel in including both SD and IT model approaches. Parameters created from our viability data was used to predict the lethal effects of PFOA on loggerhead cells over time. This is the first report of any model applied to infer the survival of sea turtle cells exposed to a marine contaminant. Effectiveness of both SD and IT GUTS models will be further analyzed using profile likelihoods, confidence intervals, and r-squared. This study creates a paradigm for toxicological studies in sea turtles by extrapolating the toxic effects from cells to individual sea turtles, using survival likelihood endpoint, and assessing the use of a less-invasive tool to monitor toxicological effects of marine contaminants in an endangered marine species.

ABSTRACTS FOR POSTER PRESENTION

4. The Impact of Exposure to Light Emitting Diode (LED) Domestic Light, on *Caenorhabditis Elegans*

Fatimah Alhamadah, *Fawzia Abdel-Rahman*

This study aimed to investigate the biological impact of exposure on domestic light emitting diodes (LED) lighting using the free-living nematode *Caenorhabditis elegans* (*C. elegans*) as a model. We exposed *C. elegans* to three different sources of LED light white light, covering the range 380 to 750 nm, blue light at 450 nm and black light at 380-420 nm) for one life cycle (egg to adult) and the control which is kept in dark. The exposure to these light ranges lead to stress in *C. elegans* for example it caused the limit of lifespan to decrease to one half of the normal lifespan. Also the exposure to different LED lights decreased the number of the hatched eggs and the progeny. Results showed that the exposure delayed the maturation of the hatched eggs to the adult stage, it lowered or prevented the ability of adults to lay eggs, impaired the locomotion in the exposed worms and caused changes of body measurements compared with the control. The observed type of biological stress was also associated with the production of reactive oxygen species (ROS) as compared to nematodes grown in the dark (the control). It is concluded that the blue light component of white LED light may cause health problems and further investigation is required to test commercial brands of white LEDs that emit different amount of blue light.

5. Anti-Proliferative Effects of Neem Extracts on H1299 Cancer Cell Lines

Chukwunonso A. Anakwue, *Toluwani O. Adebayo, Mounira Morgen, Momoh A. Yakubu*

Azadirachta indica (Neem) is a member of Meliaceae mahogany family, which also happens to be a highly revered tree when it comes to traditional medicine as possibly all parts of the tree (leaves, roots, bark, flowers and seeds) have been used as key ingredients in domestic remediation of certain illnesses. Several studies have shown evidence that extracts of neem are capable of exhibiting anti-cancer effects; tumor-suppressive or anti-inflammatory as well as anti-proliferative effects. H1299 cell line was cultured in complete DMEM in flasks and was later seeded in 96 well plates. 96 well plates were treated with different doses of neem extract (2mg/ml, 0.5mg/ml and 0.1mg/ml). The rate of proliferation was compared to untreated control cells. H1299 was also treated with Calphostin C and Tyrphostin alone as well as in combination with Neem extract concentrations as indicated above. Neem extract showed significant reduction in the rate of proliferation of H1299 cell lines when compared with control at the 0.5mg/ml and 2mg/ml dose. Also, in the presence of protein kinase inhibitors; Calphostin C and Tryphostin, the effect of Neem was significantly increased by 60% for 0.5mg/ml and 2mg/ml respectively. Neem showed a great potential to act as an anti-proliferative remedy for H1299 cell lines, however, further studies need to be conducted to understand possible mechanisms of action.

6. Effects of Early Life Stage Exposure to Thyroid-altering Chemicals on the Developing Immune System of a Small Fish Model

Haley Egan, *Marlo Jeffries*

The effects of the thyroid axis on metabolism, growth, and development are well documented. However, there is a paucity of information on the role of thyroid hormones in the development of the immune system. Therefore, the goal of this study was to determine the effects of early life stage exposures to thyroid-altering chemicals on the developing immune system using the fathead minnow (*Pimephales promelas*) as the model, an organism commonly used in toxicity testing. This was accomplished by measuring differential expression of several immune-related genes in fish exposed to various doses of propylthiouracil (PTU, a thyroid-inhibitor) and thyroxine (T4, a thyroid-stimulator) sampled at 7 and 35 days post hatch (dph). Fish exposed to PTU exhibited significant increases in *rag2* expression at 7 dph, decreases *IgLC1* expression of at both 7 dph and 35 dph, and decreases in *IgLC3* expression at 7 dph. In contrast, T4-exposed fish showed elevated *rag1* and *rag2* expression at both 7 and 35 dph, increased *IgLC2* expression at 7 dph, and upregulation of *ikaros* at 35 dph. The results of this study indicate that exposure to thyroid altering chemicals influences the expression of several genes associated with proper immune system development, indicating that thyroid hormones regulate various aspects of immune development. These findings provide evidence that exposures to environmentally-relevant compounds that modulate thyroid function may lead to improper immune system development, which is likely to adversely affect overall organism health.

ABSTRACTS FOR POSTER PRESENTION

7. Morphological Effects of Alpha-solanine, 2-Propenamide and Inorganic Arsenic in Beas-2B Cells

Hoda Eltayab, *Leandra Stewart, Admola Adejayan, Vidyakiram Polaki, Desirée A. Jackson, Shodimu-Emmanuel Olufemi*

Toxicants and antioxidants were found in consumer products, household materials, and the environment. This study revealed that morphological characteristic can be used to determine individual effects of toxicants and antioxidants in Beas-2B cells. Beas-2B cells were treated individually with four different toxicants, α-solanine, 2-propenamide, and inorganic arsenic ($NaAs_2O_3$ and As_2O_3) and/or combination of the toxicants and the antioxidants (butylated hydroxyanisole (BHA; 2(3)-t-Butyl-4-hydroxyanisole)), and butylated hydroxytoluene (BHT; 2,6-Di-ter-butyl-4-methylphenol)). The effects of the toxicants and the antioxidants on cellular morphology were analyzed under a Nikon Eclipse Ti microscope. Cells treated with α-solanine displayed narrowed elongated cell like-structure with altered cellular morphology. On the other hands, 2-propenamide treated cells crammed into cology-like-pockets with blebbing like-structure. While $NaAs_2O_3$ and As_2O_3 treated cells showed mostly apoptotic and necrotic blebbing like-structure. Even in the presence of antioxidants (BHA and BHT), the altered cellular morphology changes were minimal. These findings suggest that cellular morphological changes can be used to ascertain individual toxicant and antioxidant effects in cells.

8. Epigenetic Modification of Histone 3 by Acrolein in Rat Vascular Smooth Muscle Cells

Mahsa Esmaeili, *Zivar Yousefipour, Omana Philips, Kasturi Ranganna, Mathew Joseph*

Environmental pollutants can exacerbate disease conditions by affecting chromatin structure and ultimately regulating gene expression. Acetylation of histone lysine has been reported to contribute to gene expression while the methylation results in gene inactivation. Acrolein, an environmental pollutant and a major component of cigarette smoke, has been implicated in cardiovascular toxicity and several neurological disorders such as Alzheimer's disease. N-acetyl cysteine (NAC), a precursor of glutathione, has been reported to prevent acrolein toxicity in cell culture. The goal of the present study was to investigate the effects of acrolein on modification of histone 3, lysine 9 residue (H3K9) in rat's vascular smooth muscle cells (VSMCs) in the present and absent of NAC. VSMCs were treated with 2 and 3 µg/ml of acrolein for 1, 6 and 24 hours in the present or absent of 0.2 mM NAC. At the end of the treatment, MTS essay was used to check cells viability. Western blot analysis was used to determine changes in H3K9 tri-methylation and acetylation. Additionally, immunofluorescence staining was used to analysis cellular localization of H3K9 acetylation and methylation. Cells treated with 2 and 3 µg/ml of acrolein exhibited the highest toxicity at 6 hours incubation. Acrolein exposed VSMC displayed induction of histone H3K9 acetylation for all concentrations and time periods. The most significant induction of acetylation (30% at 2 µg/ml] and 46% [3 µg/ml]) and tri-methylation (37% [2 µg/ml] & 65% [3 µg/ml]) occurred at 6 hours incubation. Co-treated VSMCs with acrolein and N-acetyl cysteine reduced H3K9 acetylation (100% for both 2 and 3 µg/ml), and tri-methylation (115% & 125% for 2 and 3 µg/ml respectively). Immunofluorescence staining further confirmed changes in acetylation and tri-methylation in acrolein treated VSCMs with or without NAC. Based on our data we are concluding that effect of acrolein on VSCMs is partially due to alterations of H3K9 methylation and acetylation which can be prevented with addition of 0.2 mM NAC.

9. Selenium Counteracting Effects of Mercury Induced Liquid Profiling in Free Living Nematode *Caenorhabditis Elegans*

Sakha Jamadar, *Kevin Anthony, Duma Hlangothi, Fawzia Abdel-Rahman*

Exposure to mercury (Hg) compounds is a serious threat to public health. Organomercuric compounds such as phenyl mercury acetate (PMA) can cause harmful damage to the nervous system. *Caenorhabditis elegans* (*C. elegans*) studies showed that mercury exposure induces neuron degeneration likely due to the increase in reactive oxygen species (ROS). Selenium (Se) is an essential trace element required for activation of many antioxidant enzymes. Accordingly, Se is capable of decreasing deposition of Hg during co-exposure possibly due to the high affinity between Hg and Se and reducing the ROS level by activating antioxidant enzymes. *C. elegans* was used to compare the induced ROS level following co-exposure to PMA and Se, and also was utilized to identify the antagonistic effect of Se on PMA induced lipid profiling at a sub-lethal concentration of PMA. ROS was determined for exposed worms to PMA with/out Se using the probe 2, 7- Dichlorodihydrofluorescein diacetate (DCFH-DA). Fluorescence intensity was measured using Spectrofluorometer at excitation 430nm and detection 530nm. Exposed worms were used to investigate the exposure effect on the lipid profile of *C. elegans*. Lipid profiling is analyzed by using Ion Trap liquid chromatography-mass spectrometry (HPTLC) and high-performance thin layer chromatography (LC-MS). Results showed that Se decreased the ROS level induced by PMA in co-exposure, which eventually affected the lipid profiling of the nematodes. HPTLC and Ion Trap LC-MS results showed differences in the lipid profile after co-exposure to PMA and Se. Elucidation and identification of the chemical lipid components will be presented.