South-Central SETAC

Regional Chapter Annual Meeting

April 7th – 9th 2022

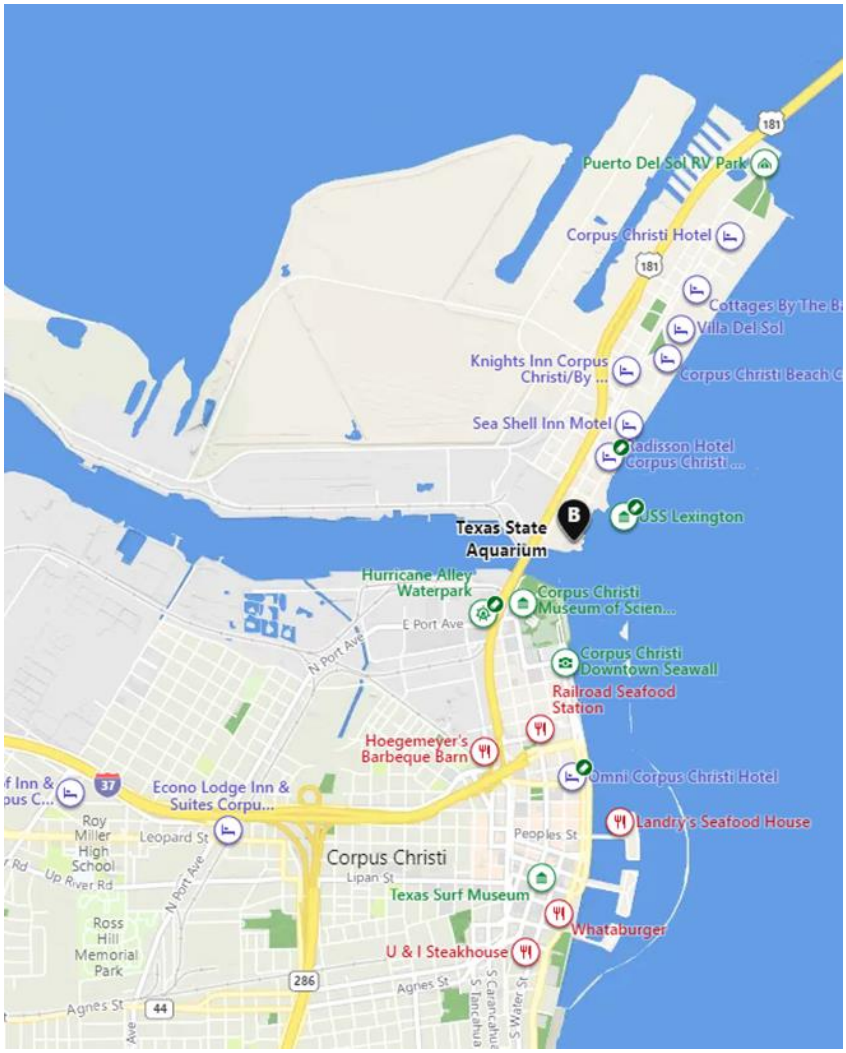
Hosted by Texas A&M University Corpus Christi at the Texas State Aquarium, Corpus Christi, TX

Sponsors and Contributors

ThermoFisher
SCIENTIFIC

Directions From Texas A&M University –Corpus Christi

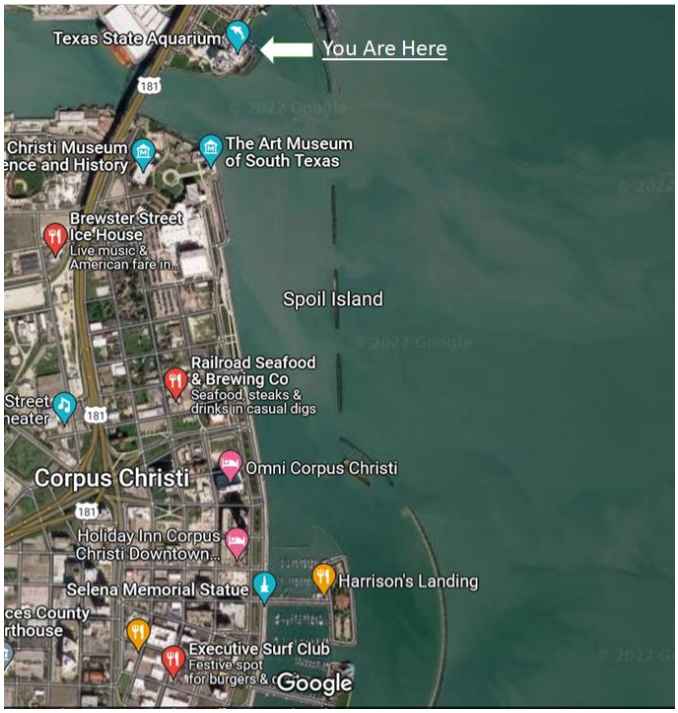
- Turn left onto Ocean Dr
  Pass 7-Eleven on the left in 1.0 mi
  Continue on for 6.9 mi
- Road name changes to S Shoreline Blvd
  0.8 mi
- Road name changes to N Shoreline Blvd
  0.8 mi
- Turn left onto I-37 N / IH 37
  0.2 mi
- Take the ramp on the right for TX-35 / US-181 and head toward Portland
  1.5 mi
- Take the ramp on the right for E Causeway Blvd and head toward North Beach / Texas State Aquarium / USS Lexington
  0.3 mi
- Turn right onto Burleson St, then immediately turn right onto Timon Blvd
- Exxon on the corner
  0.5 mi
- Bear right onto E Surfside Blvd
  0.2 mi
- Bear left onto Pearl St, then immediately turn right onto N Shoreline Blvd
  515 ft
- Arrive at N Shoreline Blvd
- The last intersection before your destination is Pearl St



Texas State Aquarium
2710 N Shoreline Blvd, Corpus Christi, TX 78402
https://www.texasstateaquarium.org/

Lunch options:

Restaurants (Nearest to Farthest)	Address	Avg Costs
Pier 99 Restaurant	2822 N Shoreline Blvd, Corpus Christi, TX 78402	$15-30+
Blackbeard's On the Beach	3117 Surfside Blvd, Corpus Christi, TX 78402	$15-30+
Yo Philly Cheese Steaks	3314 Surfside Blvd, Corpus Christi, TX 78402	$10-15
Whataburger	4444 E Causeway Blvd, Corpus Christi, TX 78402	$10-15
Brewster Street Ice House	1724 N Tancahua St, Corpus Christi, TX 78401	$15-20+
Railroad Seafood & Brewing Co	1214 N Chaparral St, Corpus Christi, TX 78401	$20-35+
Executive Surf Club	306 N Chaparral St, Corpus Christi, TX 78401	$15-20



Meeting Program

Thursday, April 7th

7:00 pm – 9:00 pm	Fajita buffet	Executive Surf Club 306 N Chaparral St, Corpus Christi, TX 78401

Friday, April 8th

8:30 am – 9:00 am	Breakfast at the Texas State Aquarium, 2710 N Shoreline Blvd, Corpus Christi, TX 78402	
9:00 am – 9:15 am	**Welcome Session**	Dr. Edward Mager (Chapter President) and Dr. Sarah Hughes (NA SETAC board representant)
9:15 am – 9:30 am		Dr. Cherie McCollough (Chair, Department of Life Sciences, Texas A&M University-Corpus Christi)
9:30 am – 10:30 am	**Plenary Session**	Dr. Jill Jenkins, United States Geological Survey, Wetland and Aquatic Research Center

Diagnostic Animal Biomarkers: Harmful Algal Bloom Cyanotoxins and the Critical Minerals

In understanding potential influences of environmental stressors at the cellular and molecular levels, two important national topics in need of microbiological/ecotoxicology investigations include harmful algal blooms and the critical minerals. By developing data along an adverse outcome pathway resulting from toxin/stressor exposure, measures of response yield insight into health outcomes. Algal and cyanobacterial blooms pose risks to human and animal health and ecosystem sustainability around the world. Some blooms produce toxins that can lead to illness or mortality when animals and humans are exposed; results from dosed mallard ducks and primary murine hepatocyte culture are yielding insight. The second topic of the presentation involves critical minerals; they are non-fuel elements essential to the economic and national security of the U.S., having supply chains vulnerable to disruption, and serving essential functions in product manufacturing. To understand how the critical mineral commodities can be used in greater quantities and harvested and handled in safe and environmentally responsible manners, the goal is to review and outline the known and potential health effects in humans and fish. Additional highlights will be given of applying the adverse outcome pathway approach to research.

About Dr. Jenkins:

Jill is a Research Microbiologist whose research is directed at understanding the condition of animals, generating data at the cell and molecular level. She works within the USGS Ecosystems Mission Area, with the Environmental Health and Invasive Species Programs. Diagnostic tools typically designed for use with humans and domestic animals are applied to address hypotheses in the environmental sciences. Key laboratory biotechnologies she uses are photomicroscopy and flow cytometry. Overall, the work is to research and develop biomarkers of exposure and effect for integrated use in conservation science, whereby the tools are then applied by DOI management agencies. The PI has comparative biology/immunology expertise to address cell and molecular level questions with organisms in any taxon, from bacteria to mammals.

10:30 am – 10:45 am	Coffee Break
10:45 am – 12:00 am	**Session 1: Chemistry and Exposure Assessment** Chairs: Oluniyi Fadare, Chi Huang
10:45 am	**Characterization of non-petroleum oils in support of emergency response and ecosystem assessment** Laura Basirico, Margaret Knight and Kevin Armbrust; Louisiana State University
11:00 am	**Toxicity of 6PPD-quinone among fishes across ontogeny** Kerri Lynn Ackerly; Kathleen J. Roark, Andrew J. Esbaugh, Kristin Nielsen; The University of Texas at Austin Marine Science Institute
11:15 am	**Monitoring Parabens and Paraben Transformation Products Upstream and Downstream of Wastewater Treatment** Michael Penrose; Baylor University; George Cobb; Baylor University
11:30	**Short-Chain Per- and Polyfluoroalkyl Substances (PFAS) Effects on Human Phase I Biotransformation Enzymes** Megan Solan and Ramon Lavado; Baylor University
11:45 am	**Toxic Effects of Photodegraded Anthracene on Skin Barrier Development and Epidermal Inflammatory Response** Molly Brzezinski, Leisha Martin and Wei Xu; Texas A&M Corpus Christi
12:00 pm – 1:30 pm	Lunch Break
1:30 pm – 3:15 pm	**Session 2: Aquatic Toxicology** Chairs: Leisha Martin, Rijith Jayarajan
1:30 pm	**Exposure to Roundup on oxidative/nitrative stress, Na+/K+-ATPase and antioxidant enzymes expression in the gills of goldfish** Md Imran, Noor; Saydur, Rahman; University of Texas Rio Grande Valley
1:45 pm	**The Effect of Chinaberry (Melia azedarach) Leaves and Bark on Texas Native Crayfish** Noah Hawkins, Halli Lovell, Gio Barragan, Rachel Rompel, Chris Distel; Schreiner University
2:00 pm	**Using methylmercury to examine fluxes in riparian food webs: tales of an atypical tracer** Tonya L., Ramey**;** Texas State University Celeste L., Ortega-Rodriguez; Texas Christian University / Matthew M., Chumchal; Texas Christian University / Todd, Swannack; US Army Engineer Research and Development Center, Texas State University / Weston H., Nowlin; Texas State University
2:15 pm	**Co-exposure to crude oil and ultraviolet (uv) radiation induces cataract formation in fishes: a novel endpoint of photo-induced crude oil toxicity** Rachel Leads and Aaron Roberts; University of North Texas
2:30 pm	**Exposure to hypersalinity and per- and polyfluoroalkyl substances (PFAS) cause developmental effects in Red Drum** Kathleen Roark, Kerri Lynn Ackerly and Kristin Nielsen; University of Texas at Austin

Marine Science Institute

2:45 pm **Effects of embryonic exposure to Aroclor 1254 on neurologic, cardiac, growth, and reproductive endpoints in zebrafish** Corey S. Green; University of North Texas, Jeffery M. Morris; Abt Associates, Jason T. Magnuson; University of California, Rachel Leads; University of North Texas, Claire R. Lay; Abt Associates, Michel Gielazyn; NOAA, Lisa Rosman; NOAA, Daniel Schlenk; University of California, Aaron P. Roberts; University of North Texas

3:00 pm – 3:15 pm Coffee Break

3:15 pm – 4:15 pm **Session 3: Environmental and Wildlife Toxicology**

Chairs: Elizabeth Dibona, Nin Gan

3:15 pm **Acute exposure of early life stage zebrafish (*Danio rerio*) to Deepwater Horizon crude oil impairs glomerular filtration and renal fluid clearance capacity**
Fabrizio Bonatesta, Victoria, Messerschmidt; University of Texas at Arlington, Leah Schneider; University of North Texas, Lee Juhyun; University of Texas at Arlington, Amie Lund and Edward, Mager; University of North Texas

3:30 pm **Comparative cytotoxicity induced by parabens and their halogenated byproducts in human and fish cell lines**
Ashley Ball, Marco Franco, Megan Solan and Ramon Lavado; Baylor University

3:45 pm **Application of edible montmorillonite clays for the adsorption and detoxification of microcystin**
Meichen Wang, Kelly Rivenbark; Texas A&M University, Joonho Gong, Fred Wright; University of North Carolina, and Timothy, Phillips; Texas A&M University

4:00 pm **Investigating the Relationship Between Microplastics and Beach Invertebrate Communities**
Maureen Hayden; Texas A&M University

4:15 pm **Fluorescent Polystyrene Encapsulated ZnO as an Alternative Material for Nanoplastics Toxicology Research**
Leisha Martin, Molly Brzezinski, Kayla Simpson, Mackenzie Merrill and Wei Xu; Texas A&M University Corpus Christi

4:30 – 5:30 pm **Poster Session**

6:00 – 9:00 pm Social Dinner at the Art Museum of South Texas,

1902 N Shoreline Blvd, Corpus Christi, TX 78401

Saturday, April 9th

8:30 – 9:00 am Breakfast

Texas A&M University Corpus Christi (TAMU–CC), 6300 Ocean Drive

Dr. Robert Ferguson Engineering Building (RFEB)

Room 104

9:00 – 11:00 am	Chapter Board Meeting	TAMU–CC, RFEB Room 104
9:00 – 11:00 am	Student Workshop: Graphic Design and Data Visualization Dr. Andrea Hempstead, Assistant Professor of Graphic Design, Texas A&M University-Corpus Christi	TAMU–CC, RFEB Room 106
11:00 – 12:00 pm	Chapter Student Meeting	TAMU–CC, RFEB Room 104
1:30 – 4:30 pm	**Tours**	
1:30 pm	Campus Bird Watching Tour with Molly Brzezinski	
1:30 pm and 2:00 pm	Departure to the Laguna Madre field station at Marker 37	
1:30 pm	Departure to the AgriLife Facility at TAMU–CC	
3:00 pm	Departure from the AgriLife	
4:00 and 4:30 pm	Return to Marker 37	

Platform Presentations

PLATFORM PRESENTATION ABSTRACTS

PL01. Characterization of non-petroleum oils in support of emergency response and ecosystem assessment

Laura Basirico,[1] Margaret, Knight,[1] and Kevin Armbrust[1]

[1]*Louisiana State University*

With the advent of containerized trade and global supply chains, oceans are increasingly important transport routes for ships. Seaborne trade has doubled in the past 20 years, with 11 billion tons loaded in 2019. Even as non-petroleum oils are a growing in global transport, there are minimal data on the chemical and physical properties of these oils. The increase in global transport and recent spill incidents involving these oils highlight the need for advancements in extraction methods and analytical identification of biogenic oils. In 2020, a spilled substance was reported in Savoonga, AK, coating and killing number of seabirds. Initial response suggested the substance was a non-petroleum oil like vegetable or fish oil, released and solidified in cold water. Samples were analyzed via GC/MS methods for semi-volatile compounds and results determined constituents in the unknown matrix were of non-petroleum origin. In addition to qualitative differences, including patterns of alkanes and PAHs unlike from typical petrogenic fuels and oils, the substance contained undetectable concentrations of EPA Priority PAHs and no high molecular weight aromatic compounds. Resultantly, tools have been developed, including an effective extraction and analytical method for the characterization of non-petroleum oils. The current research characterizes chemical profiles of high priority, novel non-petroleum oils via GC/MS to aid in identification of spilled substances in nearshore environments.

PL02. Toxicity of 6PPD-quinone among fishes across ontogeny

Kerri Lynn Ackerly,[1] Kathleen J. Roark,[1] Andrew J. Esbaugh,[1] Kristin Nielsen[1]

[1]*The University of Texas at Austin Marine Science Institute*

Recurrent large-scale fish kills following storms are a serious issue for salmon populations migrating through highly urbanized watersheds in the Pacific Northwest region of the US. Recently, these mass die-offs were linked to tire wear particles (TWPs) on roadways, which are washed into nearby waters by stormwater runoff. The lethality of TWPs has been attributed to 6PPD-quinone (a quinone byproduct of the ubiquitous tire antiozonant 6PPD), which has a median lethal concentration of <1-Âµg/L for juvenile coho salmon. There is a paucity of data describing the differential toxicity of this compound across species and ontogenies, or its sub-lethal effects on developing fish. Moreover, to our knowledge, no toxicity values have been developed for estuarine fish species. This data gap is particularly noteworthy, as estuaries that receive inflows from highly urbanized watersheds are especially vulnerable to TWP. The goals of this study were to determine the toxicity of 6PPD-quinone to both model and non-model estuarine fishes; examine the relative sensitivities of ontological stages in each species; and derive sub-lethal toxicity values for early life stage. Results indicate the toxicity of 6PPD-quinone varies demonstrably across species and ontogeny, with toxicity values spanning orders of magnitude in some instances. Findings of the present study represent a substantial contribution towards advancing our knowledge of this newly identified and pervasive environmental toxicant.

PL03. Monitoring Parabens and Paraben Transformation Products Upstream and Downstream of Wastewater Treatment

Michael Penrose[1] and George Cobb[1]

[1]*Baylor University*

This study focuses on parabens, a class of commonly used antimicrobials, and their transformation products released in effluent after treatment in wastewater treatment plants. The goal of this research is to identify and quantify released paraben transformation products in surface water both before and after wastewater treatment. Analytes include parent paraben compounds, two degradation products, four chlorinated products, and ten brominated products. Findings indicate that transformation products are present in surface water downstream of wastewater treatment facilities. Para-hydroxybenzoic acid (PHBA) was detected in greater concentrations at sites before treatment. With an average concentration of 84.8 ng/L at the closest site prior to wastewater treatment and 46.3 ng/L at the closest site after treatment. The post treatment site nearest to the plant had greater concentrations of chlorinated transformation products, with dichlorinated methyl paraben (Cl2MeP) being present at an average concentration of 12.1 ng/L, compared to 1.52 ng/L at the pretreatment site. Degradation product concentrations increased further downstream, showing that degradation is occurring. Parent compound concentrations also increase downstream, meaning that parabens and degradation products could be entering the environment from other sources. Dichlorinated parabens are more persistent than monochlorinated species, with only small decreases in concentrations observed at sites further downstream.

PL04. Short-Chain Per- and Polyfluoroalkyl Substances (PFAS) Effects on Human Phase I Biotransformation Enzymes

Solan Megan[1] and Lavado Ramon[1]

[1]*Baylor University*

Per- and polyfluoroalkyl substances (PFAS) are a large class of compounds found in a broad range of indoor and outdoor environments. Evidence for adverse health effects in humans prompted the development of short-chain alternatives to mitigate some of the toxic effects observed with the long-chain variants. However, there is a lack of toxicity data for short-chain PFAS, and even less is known about their effects in mixtures. A previous study suggested that perfluorooctanoate (PFOA) and perfluorooctane sulfonate (PFOS) reduced the expression of several biotransformation enzymes in the human liver cell line, HepaRG. The goal of the present study was to investigate the effects of short-chain PFAS, including perfluorobutane sulfonic acid (PFBS), 2,3,3,3-tetrafluoro-2-(heptafluoropropoxy)-propanoate (GenX), perfluorohexane sulfonate (PFHxS), perfluorohexanoic acid (PFHxA), and 6:2 fluorotelomer alcohol (6:2 FTOH), on cytochrome P450 enzymes (CYP1A1 and CYP3A4) in HepaRG cells. Single exposures and co-exposures with CYP-inducers, Rifampicin and Benzo(a)pyrene, were conducted to evaluate their inhibition potential in binary mixtures. Additionally, we determined inhibitory concentrations for long-chain and short-chain PFAS in recombinant CYP2C19, -2D6, -2E1, and -3A4 enzymes (Supersomesâ„¢). Our results indicate that the interference of PFAS with CYP450 enzymes could lead to adverse outcomes resulting from the inability of biotransformation pathways to function as needed.

PL05. Toxic Effects of Photodegraded Anthracene on Skin Barrier Development and Epidermal Inflammatory Response

Molly Brzezinski,[1] Leisha Martin,[1] Wei Xu;[1]

[1]*Texas A&M Corpus Christi*

Anthracene is chemical in the class of polycyclic aromatic hydrocarbons (PAHs) that is acutely toxic and is associated with skin, lung, and bladder cancer. UV radiation can modify the chemical structure of PAHs, but the impact of these changes on toxicity has not been studied. The human skin barrier is our first defense against environmental pollutants and is a priority model to understand the phototoxic effects of anthracene. Our objective is to assess the effects photodegraded anthracene and identify the initiation of an inflammatory response by keratinocytes. Anthracene was degraded under simulated sunlight for 1,4, 8 and 24 hours and applied to 3D cultured and monolayer keratinocytes, and mouse skin in vivo. 4-hour photodegraded products increased epidermal thickness above control values mouse exposures, and 3D cultured keratinocytes also expressed differential thickness. Impact on skin barrier development by photodegraded treatments was exemplified by disparate cytokeratin 10 and 14 staining in 3D cultured keratinocytes. Additionally, photodegraded anthracene altered the expression of a number of inflammation related genes including il1b, s100A9, and connexin43 in mouse epidermis, and TNFa, TLR4, mmp1a, il1b, and MIF in 3D cultured human keratinocytes. These results indicate that photodegraded anthracene initiates unique inflammatory responses in the epithelium, which can inform risk assessment for exposure to other photodegraded PAH compounds.

PL06. Exposure to Roundup on oxidative/nitrative stress, Na+/K+-ATPase and antioxidant enzymes expression in the gills of goldfish

MD Imran Noor[1] and Saydur Rahman[1]

[1]*University of Texas Rio Grande Valley*

Growing population, urbanization, and heavy anthropogenic activities amplified interaction with the environment, leading to exponential exploitation of natural resources, which often results in environmental pollution. We frequently bombarded aquatic environments with toxic chemicals. One of the significant sources of noxious chemical effluent in the aquatic environment is the ever-growing classification of different pesticides used in agriculture. In our study, we examined the dose-dependent (low dose: 0.5 mg/L, high dose: 5 mg/L) effects of Roundup, a glyphosate-based herbicide, on oxidative/nitrative stress, Na+/K+-ATPase, and antioxidant enzymes expressions in the gills of goldfish (*Carassius auratus*, a model teleost species). Histopathological analysis showed widespread damage, including fusion of secondary lamellae, long thin filaments like primary lamellae, and loss of normal architecture in gill tissues in Roundup exposure groups compared to controls. Immunohistochemical analysis demonstrated a significant increase in dinitrophenyl protein (DNP, a biomarker of reactive oxygen species, ROS), nitrotyrosine protein (NTP, a biomarker of reactive nitrogen species, RNS), Na+/K+-ATPase, catalase, and superoxide dismutase expressions in the gill tissues under Roundup exposure groups. Overall, our findings suggest that glyphosate-based herbicide Roundup increases ROS/RNS, leading to damaged gill tissues and impairing respiratory functions in teleost species.

PL07. The Effect of Chinaberry (Melia azedarach) Leaves and Bark on Texas Native Crayfish

Noah Hawkins,[1] Halli Lovell,[1] Gio Barragan,[1] Rachel Rompel,[1] Chris Distel[1]

[1]*Schreiner University*

Chinaberry trees (Melia azedarach) are a globally invasive ornamental plant. Their tissues are toxic to some animals. Because shed berries, leaves, and bark commonly fall into aquatic systems, they may pose a threat to native aquatic species. Environmental chemistry analyses have indicated that most of the toxins in chinaberry plants are present in the fruits and seeds. Preliminary work has shown that direct exposure of native aquatic arthropods (dragonflies & crayfish) to chinaberry fruits produces high mortality at very low exposure doses. However, the toxicity of chinaberry leaves and bark to the crayfish species is unknown. Here we show that chinaberry leaves and bark also significantly reduced survival for two different native crayfish species. This direct exposure was at comparable mass to low-dose berry exposures and suggests that shed chinaberry leaves and bark may be equally toxic to aquatic arthropods. This suggests that toxin concentrations in leaves and bark are functionally equivalent to berries at certain times of year. The results reaffirm and expand our knowledge on toxicity of chinaberry to aquatic species, emphasizing a little-studied threat to native Texas biodiversity.

PL08. Using methylmercury to examine fluxes in riparian food webs: tales of an atypical tracer

Tonya L., Ramey,[1] Celeste L. Ortega-Rodriguez,[2] Matthew M. Chumchal,[2] Todd, Swannack,[1,3] Weston H. Nowlin[1]

[1]*Texas State University,* [2]*Texas Christian University,* [3]*US Army Engineer Research and Development Center*

Chemical tracers are used to illustrate the flow of energy between adjacent ecosystems, such as aquatic terrestrial systems in riparian zones. Stable isotopes are the most used tracer in riparian studies, but other chemical tracers can differ between aquatic and terrestrial habitats, are transferred through diet, and can bioaccumulate. Methylmercury (MeHg) is examined solely as a contaminant in most riparian studies, but we show it can also serve as a chemical tracer in determining riparian predator diets. We estimated diets of five riparian spider families living around experimental ponds using traditional stable isotopes Î´13C (C) and Î´15N (N), and MeHg (M). Spider families included cursorial (Lycosidae, Oxyopidae, and Salticidae), web-building (Tetragnathidae), and fishing (Pisauridae) strategies. We used one- (C, N, M), two- (C+N, C+M, N+M), and three-tracer (C+N+M) dietary mixing models to determine the proportion of aquatic insect prey to each family's diet. Estimated aquatic contribution to diets was similar across models, but the C+M and C+N+M models had the smallest credible intervals because Î´15N did not differ between terrestrial and aquatic prey, and thus has limited utility. We then used top models for niche space projections and estimated pairwise niche overlap between spider families. We conclude that ecologists should consider the use of contaminants in ecological contexts when contaminants differ between sources and trophic fractionation factors are known.

PL09. Co-exposure to crude oil and ultraviolet (uv) radiation induces cataract formation in fishes: a novel endpoint of photo-induced crude oil toxicity

Rachel Leads[1] and Aaron Roberts[1]

[1]*University of North Texas*

Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous in the environment due to both natural and anthropogenic activity. Exposure to ultraviolet (UV) light can significantly increase the toxicity of PAHs to aquatic organisms through photo-induced toxicity. While increased mortality is a well-documented effect of photo-induced toxicity, few studies characterize sublethal effects. Impaired vision is one sublethal effect that may impact fitness and ecological performance. In fishes, the eyes are particularly vulnerable to contaminant exposure which can induce cataract formation and impair vision. Here, we developed a novel method to quantify cataract formation in fish lenses following PAH exposure by measuring changes in lens absorbance/optical density. In addition, we used fixed wavelength fluorescence to assess adsorption of PAHs to lenses. Lenses were dissected from field-collected spotted gar (*Lepisosteus oculatus*) and were exposed to PAHs in crude oil water accommodated fractions in the presence or absence of UV (12 h/d) for 24 h. We measured absorbance and fluorescence using a microplate reader at 48, 72, 96, and 120 h. Optical density of lenses significantly increased following co-exposure to PAHs and UV at 96 and 120 h, indicating an effect of photo-induced toxicity. Increased fluorescence was also observed in lenses following exposure, indicating adsorption of PAHs to tissue. These results provide a novel endpoint of crude oil photo-induced toxicity in fishes.

PL10. Exposure to hypersalinity and per- and polyfluoroalkyl substances (PFAS) cause developmental effects in Red Drum

Kathleen Roark,[1] Kerri Lynn Ackerly[1] and Kristin Nielsen[1]

[1]*University of Texas at Austin Marine Science Institute*

Estuaries are important sites for many biological and ecological processes, including acting as a nursery habitat for fishes. Freshwater inflow from terrestrial sources and tidal inflow from the ocean cause salinity fluctuations and gradients that estuarine biota must tolerate. Changes in flow regimes can result from anthropogenic activity in coastal watersheds, and via rising temperatures related to climate change. Salinities outside of tolerated ranges are known to impact development in fishes, but experimental data is limited. Estuaries are also vulnerable to contamination by per- and polyfluoroalkyl substances (PFAS), a large class of manmade compounds that are used in a variety of applications. These compounds are highly mobile, persistent, and detected across various environmental media. Estuarine habitats along the Gulf of Mexico are vulnerable to PFAS contamination from several sources, and many PFAS remain understudied with little ecotoxicological data available for evaluating ecological risk in marine species or impacted estuaries. Early life stage red drum (*Sciaenops ocellatus*) were selected for this study due to their commercial and ecological importance, as well as their abundance in the Gulf of Mexico, a system which experiences both fluctuations in salinity and contamination by PFAS. Results of the present study address important gaps in our knowledge regarding the effects of PFAS contamination and hypersalinity, separately and in combination with one another.

PL11. Effects of embryonic exposure to Aroclor 1254 on neurologic, cardiac, growth, and reproductive endpoints in zebrafish

Corey S. Green,[1] Jeffery M. Morris,[2] Jason T. Magnuson,[3] Rachel Leads,[4] Claire R. Lay,[2] Michel Gielazyn,[5] Lisa Rosman,[5] Daniel Schlenk,[3] Aaron P. Roberts[1]

[1]*University of North Texas,* [2]*Abt Associates,* [3]*University of California,* [4]*University of North Texas,* [5]*NOAA*

Polychlorinated biphenyls (PCBs) are long-lived synthetic compounds that were widely used until 1979. We investigated the effects of exposure to Aroclor 1254 in zebrafish embryos and correlated them to tissue concentrations. Embryos were exposed at 6 hpf via aqueous solution for 96 hr without renewal. Nominal concentrations of Aroclor 1254 ranged from 6% to 700% of measured concentrations. Tissue (embryo) samples were collected at 36 hpf for congener analysis. We collected samples at 102 hpf for RNA-Seq analysis. Heart rate and a neurological endpoint (eye tremors) were measured at both 102 and 174 hpf, and cardiac edema was assessed at 102 hpf. Growth was assessed every two weeks after 1 mpf and reproductive trials started at 4 mpf. Cardiac edema was not present; however, dose-dependent bradycardia was observed at 102 hpf. Similarly, a dose dependent increase in eye tremor duration was observed at both 102 and 174 hpf. Eye tremor behavior appears similar to that of other dopaminergic-related neurodegeneration associated with PCB exposure. Bioinformatic analyses found that the top biological processes affected included visual function pathways supporting the eye tremor phenotypes. These findings are important in relating a novel neurotoxic endpoint to tissue concentrations of PCB in early lifestage fishes.

PL12. Acute exposure of early life stage zebrafish (Danio rerio) to Deepwater Horizon crude oil impairs glomerular filtration and renal fluid clearance capacity

Fabrizio Bonatesta,[1] Victoria Messerschmidt,[1] Leah Schneider,[2] Lee Juhyun,[1] Amie Lund,[2] Edward, Mager[2]

[1]*University of Texas at Arlington*, [2]*University of North Texas*

The pronephros (early-stage kidney) is an important osmoregulatory organ, and the onset of its function occurs relatively early in some teleost fishes. As such, any defects in kidney development and function are likely associated with a decreased ability to osmoregulate. Previous work has shown that ELS zebrafish (Danio rerio) acutely exposed to Deepwater Horizon (DWH) crude oil exhibit transcriptional changes in key genes involved in pronephros development and function, as well as morphological and osmoregulatory defects. The objective of this study was to examine the acute effects of crude oil exposure during zebrafish ELS on pronephros function by assessing its fluid clearance capacity and glomerular filtration integrity. Following a 72-h exposure to control conditions, low (20%) or high (40%) percentage dilutions of DWH high energy water-accommodated fractions (HEWAF) of oil, zebrafish were injected into the common cardinal vein with either fluorescein-labeled (FITC) inulin to assess pronephric clearance capacity, or with FITC- 70-kDa dextran to assess glomerular filtration integrity. Fluorescence was quantified after the injections at predetermined time intervals by fluorescence. The results demonstrated an inhibited pronephric fluid clearance capacity and failed glomerular perfusion when larvae were exposed to 40% HEWAF dilutions, whereas only a reduced glomerular filtration selectivity was observed in zebrafish previously exposed to the 20% HEWAF dilution.

PL13. Comparative cytotoxicity induced by parabens and their halogenated byproducts in human and fish cell lines

Ashley Ball,[1] Marco Franco,[1] Megan Solan,[1] Ramon Lavado[1]

[1]*Baylor University*

Parabens are a group of p-hydroxybenzoic acid (p-HBA) esters used in over 22,000 cosmetics. Their safety is well documented in mammalian models, but little is known about their toxicity and metabolism in non-mammalian models. In addition to that, chlorinated and brominated parabens resulting from water treatment have been identified in wastewater effluent. In this study, we explored the cytotoxic effects (LC50) of parabens (methyl-, ethyl-, propyl-, butyl-, and benzylparaben; MeP, EtP, PrP, BuP and BeP) and the primary metabolite, 4-hydroxybenzoic acid (4-HBA), as well as three of the wastewater disinfection byproducts on fish (catfish and rainbow trout gills; rainbow trout and fathead minnows hepatocytes) and human cell lines (hepatocytes and enterocytes). A strong relationship was observed between toxicity and the chain length of the parent paraben. As a general trend, the tested compounds showed this scale of toxicity: 4-HBA<MeP<EtP<PrP<BuP<BeP. Interestingly the halogenated byproducts showed an increase in toxicity with the addition of second chlorine and then the substitution of the two chlorines with two bromides. The data reported in this study support follow-up studies examining the mechanism of toxicity in fish cells and a closer look at the potential bioactivation of the metabolite 4-HBA due to its cytotoxicity in fish cells and its high reported concentrations in the literature.

PL14. Application of edible montmorillonite clays for the adsorption and detoxification of microcystin

Meichen, Wang,[1] Kelly Rivenbark,[1] Joonho Gong,[2] Fred Wright,[2] Timothy Phillips[1]

[1]*Texas A&M University,* [2]*University of North Carolina*

Exposure to microcystins (MCs) in humans and animals commonly occurs through the consumption of drinking water and food contaminated with cyanobacteria. Although studies have focused on developing water filtration treatments using activated carbon, dietary sorbents to reduce the bioavailability of MCs from the stomach and intestines have not been reported. To address this need, edible montmorillonite clays were characterized for their ability to bind MC containing leucine and arginine (MC-LR) under conditions simulating the gastrointestinal tract and compared with a medical-grade activated carbon. Results of in vitro adsorption isotherms and thermodynamics showed that binding plots for MC-LR on montmorillonites fit the Langmuir model with high binding capacity, affinity, Gibbs free energy, and enthalpy. The *in silico* results from molecular modeling predicted that the major binding mechanisms involved electrostatics and hydrogen bonds, and that interlayers were important binding sites. The safety and detoxification efficacy of the sorbents against MC-LR were validated in living organisms, including Hydra vulgaris, Lemna minor, and Caenorhabditis elegans. All 3 bioassays confirmed dose-dependent protection from MC-LR, validated the in vitro and *in silico* findings, and suggested that edible montmorillonites are safe and efficacious binders for MC-LR. Moreover, their inclusion in diets during algal blooming seasons could protect vulnerable populations of humans and animals.

PL15. Investigating the Relationship Between Microplastics and Beach Invertebrate Communities

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The goal of this study is to determine if there is a relationship between beach invertebrate communities and plastic pollution and to identify if marine invertebrates ingest microplastics. Galveston Island State Park, Mustang Island State Park, and Sea Rim State Park were sampled. Collections took place twice per sampling period throughout the year; summer (May-August), fall (September-December), and spring (January-April) from June 2021 through August 2022. Sediment cores were taken to collect invertebrates and sediment samples. Five nearshore transects, each 10 meters apart, were taken from the swash zone using a sediment corer (10 cm diameter, 10 cm h). Invertebrate samples were sorted for each nearshore transect and station. Methods development is underway to determine the best protocol for extracting microplastics from sediment using the Sediment Microplastic Isolation Unit (SMI Unit) and corresponding protocol from Coppock et al 2017. Once the invertebrates are sorted, groups of 10 invertebrates from each taxa (if available) will undergo a tissue digestion assay in 10% potassium hydroxide and be examined for presence/absence of naturally ingested microplastics. Presence/absence data of naturally ingested microplastics from invertebrate specimens and invertebrate community diversity/richness will be compared to microplastics found in sediment core samples from each sample site.

PL16. Fluorescent Polystyrene Encapsulated ZnO as an Alternative Material for Nanoplastics Toxicology Research

Leisha Martin,[1] Molly Brzezinski,[1] Kayla Simpson,[1] Mackenzie Merrill,[1] and Wei Xu[1]

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Nanoparticles (NPs) that can be optically tracked are of interest for cell and organismal biodistribution studies. NPs with surface functionalizations linking or adsorbing dyes or fluorophores may detach or leach, resulting in artifacts. Materials with encapsulated fluorescent molecules or quantum dots (QDs) are of interest for bio tracking while avoiding artifacts due to leaching. NP surfaces altered to carry dyes or fluorophores are also anticipated to affect toxicity profiles, protein interactions, and cell-uptake. Polystyrene (PS) encapsulated zinc oxide (ZnO) quantum dots (QDs) were produced using oligomerized THPPs. The material was investigated as a potential model, having optical properties for tracking, to determine cellular uptake and biodistribution of nanoplastics with inert, unfunctionalized surfaces. Transparent polymer encapsulated fluorescent molecules or QDs are attractive materials for use in other applications. They may be surface functionalized for cell targeting, drug or protein conjugation, while avoiding steric hindrance, electrostatic compatibility issues, and enhanced hydrodynamic sizes imparted by surface-bound fluorescent molecules or QDs.

Poster Presentations

PO01. Total Mercury (THg) Concentrations within southern flounder (*Paralichthys lethostigma*) tissues, livers and consumed plastics in Matagorda Bay, Texas.

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The southern flounder, *Paralichthys lethostigma*, is sought after in both commercial and recreational coastal Texas fisheries, including Matagorda Bay. Despite regulations from Texas Parks and Wildlife, there has been an ongoing decrease in population since the 1980s. Elevated levels of industrial influences, a mercury Superfund Site and localized plastic pollution, within the Matagorda Bay system may result in more harm to the population and to those consuming the fish. The hydrophobic nature of plastic makes debris more susceptible to mercury sorption, acting as a potential additional vector for this contaminant in the food web. This study will assess and compare total mercury (THg) concentrations of *P. lethostigma* tissue, liver, and consumed plastic samples. Fish (n =47) were opportunistically collected from cleaning stations in Port O'Connor, Texas from July to August of 2021. Stomachs will be visually inspected for plastic; any found will be analyzed with Fourier Transform Infrared (FTIR) spectroscopy to determine material type. Tissue, livers, and plastic THg concentrations will be determined using a Direct Mercury Analyzer (DMA). Results from this study and trends on the potential transfer of mercury from consumed plastic debris to southern flounder tissues will be presented.

PO02. Validation of a non-invasive assay for estimating stress hormones in Northern Bobwhite.

Jeremiah Leach[1]
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Northern Bobwhite (*Colinus virginianus*; hereafter bobwhite) is an economically and socially important game bird that has been declining throughout its range. There have been several factors implicated in their decline, including habitat loss and fragmentation, climate change, pesticides, and disease. There are ongoing concerted efforts to stop the decline, however; these efforts have been largely unsuccessful. A plausible contributing factor for the low success is a lack of understanding how current practices impact stress levels, and potentially survival and reproduction, in bobwhite. Here, we propose validating an Enzyme-linked Immunosorbent Assay (ELISA) for measuring stress hormone metabolites, an indicator of stress, from bobwhite feces. Validation of the ELISA protocol will include testing commercially available assays and different extraction protocols. Once the best assay and extraction combination is determined baseline fecal corticosterone metabolites (FCM) will be estimated. FCM will then be estimated following a physiological and a biological challenge. Differences in FCM will be compared between baseline, physiological, and biological challenge. The ultimate goal of this research is to develop a protocol to assess the impacts of different practices on stress hormone levels in bobwhite. This will provide us with information to improve survivability, reproduction, and ultimately the sustainability of bobwhite.

PO03. Potentiating effect of Polystyrene Nanoplastics to Dichlorodiphenyltrichloroethane (DDT) in Zebrafish larvae.

Oluniyi Fadare[1], Jeremy Conkle[1]
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The data on toxicity mechanisms of Nanoplastics (NPs) as vectors for harmful chemicals in aquatic organisms is still limited. We investigated the potential impacts of NPs on zebrafish in combination with DDT, a known pesticide with Central Nervous System (CNS) effects. Zebrafish embryos were exposed to NPs, DDT, and NPs/DDT of varying concentrations, and the larvae development was monitored. Acetylcholinesterase activity and the transcription of genes relating to neurotoxicity, hepatotoxicity, and endocrine disruption in larvae were investigated. No mortality was observed up to 400 mg/L NPs. The 96 h LC50 of DDT and NPs/DDT was 7.73 mg/L and 2.13 mg/L respectively. Cholinesterase activity was more inhibited in the NPs/DDT exposed groups than DDT only, suggesting that the presence of NPs significantly increased DDT toxicity. The genes were altered to varying degrees, both in DDT and NPs/DDT groups when compared with the controls. The degree of alteration followed a similar trend in most of the genes investigated. Higher gene modulation was observed in the NPs/DDT groups compared to DDT only, which indicates the potentiating toxicity effect of NPs with DDT. It is evident through this study that there is a possibility of toxicity change in a particular pollutant to an organism when it co-exists with another in the aquatic medium. To broaden our knowledge of the toxicological mechanisms of NPs and organic pollutants, more studies on combined toxicity are imperative.

PO04. Effects of High Temperature and RoundUp Exposure on Antioxidant Expression in the American Oyster: Mechanisms and Modulation of Oxidative/Nitrative Stress

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Aquatic organisms such as fish and shellfish are being exposed to various environmental stressors, for example, elevated temperature and environmental pollutants, which cause numerous biochemical and physiological changes that severely influence their growth, reproduction, and development. In this study, we observed the short-term (1-week) combined dose-dependent effect of Roundup, -a widely used herbicide with elevated temperature (30°C) on the morphology of gills and digestive glands, expression of nitrotyrosine protein (NTP, an indicator of reactive nitrogen species, RNS), dinitrophenyl protein (DNP, a biomarker of reactive oxygen species, ROS), antioxidant enzymes such as catalase (CAT) and superoxidase dismutase (SOD) in tissues of American oyster. Histological analyses of oyster's gills and digestive glands after 1-week exposure to high temperatures and glyphosate showed an increase in the mucous production in the gills and digestive glands and hemocyte aggregation in the connective tissues as well as structural change of the lumen in digestive glands. Alternation in the expression of NTP, DNP, CAT, and SOD was also observed through immunohistochemical analyses. Collectively, the results of our study suggest that combined exposure to elevated temperature and herbicide can cause oxidative and nitrative stress through overproduction of ROS and RNS and alter the expression of antioxidant enzymes in marine mollusks.

PO05. Chronic Oral Toxicity of Fomtec Enviro USP a Non-fluorinated Fire Fighting Foams to Northern Bobwhite Quail (*Colinus virginianus*).

Anna Longwell[1], Farzana Hossain[1], Seenivasan Subbiah[1], Adcharee Karnjanapiboonwong[1], Todd A. Anderson[1]
[1]*Texas Tech University*

Long chain per- and poly-fluoroalkyl substances (PFAS) have been the standard active chemicals used in aqueous film forming foams (AFFF) since the mid-1960s. Some characteristics of PFAS are persistence in the environment, the ability to resist degradation at high temperatures, the potential to bioaccumulate, and the ability to travel long distances from the point of release. As an alternative, non-fluorinated firefighting foams are being introduced with the intent of having a decreased environmental impact and decreased effect on terrestrial and aquatic organisms. However, it is important to verify the reduced ecotoxicity of these non-fluorinated foam products. In a chronic study, Northern Bobwhite Quail (*Colinus virginianus*) were used to test the ecotoxicity of Fomtec Enviro USP. Fomtec Enviro USP is a fluorine-free commercial AFFF used primarily for class B hydrocarbon fuel fires but can also be used for class A wood, paper, and textile fires. Pairs of quail were studied with endpoints of the study including growth, survival, and reproductive output. Reproductive outputs included egg hatching success and chick survival after adult oral exposure in drinking water to Fomtec Enviro USP (0 %, 0.01 %, 0.1 %, and 0.25 %). To help characterize these endpoints, the average daily intake (ADI) and toxicity reference values (TRVs) were determined.

PO06. **Effects of PCB/Aroclor and hypoxia exposure on CYP1A expression in Atlantic croaker liver: Molecular and cellular mechanisms of CYP1A regulation.**

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Cytochrome P450 1A (CYP1A) is a monooxygenase enzyme that catalyzes the biotransformation of organic xenobiotics such as polychlorinated biphenyls (PCBs). CYP1A expression in vertebrates is upregulated by exposure to PCBs, whereas it is down-regulated during hypoxia exposure. We investigated the effects of hypoxia exposure (1.7 mg/L dissolved oxygen for 4 weeks) on hepatic CYP1A expression in Atlantic croaker and on potential intermediaries in CYP1A down-regulation, as well as interactive effects of co-exposure to PCB77 and Aroclor 1254. Hypoxia exposure decreased hepatic CYP1A mRNA and protein expression, and ethoxyresorufin-O-deethylase (EROD) activity and markedly increased interleukin-1β (IL-1β) mRNA levels, endothelial nitric oxide synthase (eNOS) protein expression and protein carbonyl (PC, a reactive oxygen species, ROS) contents. These results suggest that hypoxia-induced downregulation of CYP1A is due to alterations of cellular cytokine, NOS and oxidative status. The co-planar PCB- or Aroclor-induced increase in CYP1A mRNA levels was significantly attenuated by co-exposure to hypoxia and accompanied by increases in hepatic IL-1β mRNA, eNOS protein expression, and PC contents. The results suggest that biotransformation of organic xenobiotics by CYP1A may be significantly reduced in fish co-exposed to hypoxia. This study provides the evidence for interactive effects of hypoxia with xenobiotics on hepatic CYP1A and IL-1β, eNOS, and ROS regulation in aquatic vertebrates.

PO07. **Implications of Treating Parasitic Infection in Northern Bobwhite (*Colinus virginianus*) on Overall Helminth Lifecycle.**

Hannah Suber[1]
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The Northern Bobwhite quail (*Colinus virginianus*, hereafter bobwhite), an economically and ecologically valuable gamebird, has experienced alarming population declines the past few decades. Many factors contribute to this trend, including disease. Parasitic helminths like the eyeworm, *Oxyspirura petrowi*, and the caecal worm, *Aulonocephalus pennula*, can be especially problematic. Both helminths require two hosts to complete their life cycle and insects, mainly Orthopterans, act as the intermediate hosts. Fall 2021, Orthopterans were collected from three properties. One had treated bobwhite with an anthelminthic drug for 5 years, one treated 2 years, and one was untreated. While this medication has been correlated with a decrease in bobwhite infection levels, it is unknown if this also leads to a decrease in the other hosts as well. Helminth prevalence in the insects was determined using PCR and gel electrophoresis and then compared between sites. The prevalence was significantly less in the 5-year site, while there was no significant difference between the control and 2-year site. This suggests that long-term treatment may be required to impact other phases of the parasites lifecycles. Further studies based on these conclusions may help determine the long-term impacts of treatment, estimate how quickly infection reemergence may occur after treatment is discontinued, and guide recommendations on administration so that treatment impact is as effective and economic as possible.

PO08. Effects of Tributyltin (TBT) in the American Oyster at Environmentally Relevant Concentrations: DNA Lessons and Oxidative Stress Biomarkers.

Mohan Dash[1], MD Saydur Rahman[1]
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Environmental pollution increases due to anthropogenic activities. Different types of pollutants and/or chemicals impair growth, reproduction and development in aquatic organisms. Tributyltin (TBT, an organotin compound) is a tremendously toxic substance which widely uses as antifouling paints used in boats, hulls, and ships. The toxic effect of TBT is well documented in teleost species. The American oyster (*Crassostrea virginica*) is an ideal shellfish species to study on TBT exposure DNA lesion and oxidative/nitrative stress. In this study, the effects of TBT on 8'-hyrodxy-2'-deoxyguanosine (8-OHdG, a molecular marker), dsDNA, dinitrophenyl protein (DNP, a biomarker of reactive oxygen species, ROS), 3-nitrotyrosine protein (NTP, an indicator of reactive nitrogen species, RNS), catalase (CAT, an antioxidant) in gills and digestive glands of oysters. We also analyzed extrapallial fluid (EPF) conditions in oysters. Immunohistochemical results showed that TBT exposure significantly increased 8-OHdG, dsDNA, DNP, and NTP expressions in gills and digestive glands of oysters compare to control. However, EPF pH and protein concentration were decreased in TBT exposure oysters. Collectively, these results suggest that antifouling biocides-driven ROS/RNS induces DNA damage which may lead to decreased various physiological functions in oysters.

PO09. A Quantitative Adverse Outcome Pathway for Long-term Reproductive Effects of Embryonic Exposure to PAHs using Zebrafish (*Danio rerio*).

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Polycyclic aromatic hydrocarbons (PAHs) are released to the aquatic environment through the development and utilization of fossil fuels. Embryonic exposure of fishes to PAHs can cause impaired reproduction at adulthood through epigenetic mechanisms. PAHs can activate the Ah receptor causing up-regulation of DNA methyltransferases (DNMTs) that establish DNA methylation in early life. Increased DNMTs can cause hypermethylation of the promotor region of genes involved in reproduction (e.g. GnRHR, CYP19, CYP11) leading to life-long decrease in expression. Decreased expression of these genes decreases synthesis of sex-steroids (e.g. E2) and vitellogenin (VTG) causing decreased egg production. The goal of the present study was to use the zebrafish (*Danio rerio*) as a laboratory model to quantitatively describe embryonic activation of the Ah receptor by two priority PAHs leading to reproductive failure in adulthood through epigenetic decrease in expression of reproductive genes causing less E2 and VTG. This data is being used to build upon existing adverse outcome pathway (AOP) models which quantitatively describe (1) activation of the Ah receptor leading to early life mortality and (2) decreased E2 and VTG leading to less egg production, to develop a new quantitative AOP model capable of predicting later-life impacts of embryonic PAH exposure among fishes. This model aims to guide more objective risk assessments of the potential long-term impacts on fish populations caused by PAHs.

PO10. Environmentally Conditioned Quantum Dot Nanoplastic Particle Accumulation in Different Cell Types.

Kayla Simpson[1], Xu Wei[1]
[1]*Texas A&M University- Corpus Christi*

As nanoplastic particle (NP) studies are still considered an emerging field, there is still knowledge gaps in this field such as whether one human cell type is more conducive to NP absorption than other cell types, and studies on environmentally conditioned NPs with protein corona coatings are lacking. Therefore, the objectives of this project are to 1) Quantify the difference in accumulation between cell types; 2) Determine the pathway of NP entry at the cellular level; 3) Locate NP accumulation in organelles. It is hypothesized that NPs exposed to environmental water will have the highest accumulation rates in intestinal cells. The three most common pathways of entry of NPs into the body are through food, water, and inhalation. To test this, we will utilize keratinocytes and fibroblast cells to track epidermal and dermal accumulation respectively; intestinal epithelial cells to track NPs in the gut, and alveolar type II cells to determine lung accumulation. The most common use of tracking fluorescent NPs is through the addition of fluorescent tags, which interact with cells differently than sterile NPs without tags. Therefore, we will be using a new strategy that labels NPs with a fluorescent quantum dot (QD) as a NP core. These QDs will be conditioned utilizing environmental water from the coast of Texas (EN-QD-NP) and sterilized before exposure to cell cultures. Both EN-QD-NPs and QD-NPs will be cultured with each cell type and imaged using fluorescent microscopy.

PO11. Materials for Magnetic Nanoparticle Binding and Separation of Micro and Nanoplastics.

Leisha Martin[1], Xu Wei [1]
[1]*Texas A&M University- Corpus Christi*

Nanoplastics pollution is increasing worldwide and poses a threat to humans, animals and ecological systems. Methods for the separation and quantification of nanoplastics in the environment are currently being developed. At present, there is no reliable method for removing nanoplastics from drinking water. We have investigated the potential iron oxide nanoparticles (IONPs) with hydrophobic coatings to magnetize plastic particulate waste for removal. We have produced and tested IONPs coated with several hydrophobic coatings: oleate, Siliclad®, Carboxydecyl-terminated PDMS, hydroxy-PDMS, and PAA:PDMS-Co-APMS. We performed TEM, SQUID magnetometry, DLS, XRD and zeta potential measurements, on IONPs synthesized in air and under inert gas, with different hydrophobic surface coatings. We report a significantly greater msat and differences in the crystalline structure of iron oxide NPs synthesized under inert gas vs. in air. All coatings resulted in stable hydrophobic nanocomposites

PO12. Environmentally relevant mixture of pesticides affects free-swimming behavior and induces oxidative and nitrative stress in goldfish.

Esmirna Cantu[1], Michelle Rivera[1], Britney Lacy[1], Md Saydur Rahman[1]
[1]*University of Texas Rio Grande Valley*

Aquatic organisms are noxious in a toxic environment, on account of escalating pollutants defiling their natural habitats. Anthropogenic activities, including agriculture, introduce ever increasing variety and volume of chemical contaminants. These include compounds such as pesticides (more aptly called biocides) and contribute to a wide variety of stressors vitiating aquatic ecosystems perniciously influences the life and behavior of aquatic organisms. In this study, we examined dose-dependent and time-dependent effects of pesticide mixtures (metalachlor, linuron, isoproturon, tebucanazole, aclonifen, atrazine, pendimethalin, and azinphos-methyl) (exposure at 22°C for 5 days) on the free-swimming behavior of goldfish (*Carassius auratus*, a model teleost species). Behavioral analysis showed a dose-dependent, time-dependent, decrease in distance swam and the prolonged time they stayed in each region of the tanks. Collectively, these results indicate that pesticide concoction influence behavior and negatively impact natural swimming patterns in teleost species.

PO13. Investigation of Micro and Nano Plastic Toxicity on Fresh and Salt Water Fish Embryos: The Potential Contribution of Environmental Water and the Eco-Corona.

Victoria Longo[1], Leisha Martin[1], Bea DiBona[1], Frauke Seemann[1] and Wei Xu[1]
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Micro and nano-sized plastics are pollutants of concern in environmental waters. We investigated the toxicity of micro and nanoplastics on freshwater zebrafish (*Danio rerio*) and saltwater medaka (*Oryzias melastigma*) embryos starting at 4 hours post fertilization through hatching. The freshwater fish were treated with four different particle sizes of polystyrene (PS) beads at five different dilutions: 500 nm, 10 nm, 30 nm, and 1 µm at the following dilutions: 1000 ppm, 100 ppm, 10 ppm, 1 ppm, and 0.1 ppm. The saltwater fish were treated with six different sizes of plastic particles that had been incubated in natural seawater from Corpus Christi, TX for a month prior to exposure. This was done to determine whether persistence in the environment increases or decreases toxicity of the plastics. Once in the environment, particles can form an eco-corona, which may give the particles a biological identity. We investigated 200 nm, 30 nm, 100 nm, 0.01 µm, and 1.1 µm PS in environmental saltwater, compared to PS in artificial sea water and untreated controls. We observed the fish embryos daily to compare development milestones, emergence time, and mortality rates. Although numerous previous studies have shown that PS nanoplastic exposure may have toxic effects, the influence of environmental components, such as eco-corona formation, have not been studied.

PO14. Modulation of Hemoglobin Isoform mRNA Expression in *Daphnia magna* in Response to Lead and Hypoxia Co-Exposure.

Cameron Emadi[1], Fabrizio Bonatesta[1], Edward Mager[1]
[1]University of North Texas

Developing an understanding of how stressors interact is critical in assessing environmental toxicity. Lead (Pb) is a non-essential metal and pervasive pollutant that elicits its effects as a respiratory toxicant by reducing O2 uptake and/or transport. Hypoxia, or low environmental O2, represents an additional source of stress in aquatic environments that is increasing in severity and prevalence due to anthropogenic factors; yet, little is known regarding the potential interactive effects of co-exposure to hypoxia and Pb in aquatic animals. The cladoceran, *Daphnia magna*, is a common sentinel test organism used in aquatic toxicity testing. In response to hypoxia, D. magna have been shown to elevate ventilation and heart rates. Furthermore, they can not only drastically increase hemoglobin (Hb) concentration in hypoxic conditions but also O2 affinity by altering the expression of Hb isoforms (i.e., isotype switching), of which they have seven. In contrast, exposure to Pb has been shown to decrease Hb synthesis. The purpose of this study was to investigate the roll of Hb isoform switching at the mRNA level in D. magna during co-exposures to Pb and hypoxia. We focused on adults given their size at this stage (~5 mm) exceeds the threshold for reliance on purely diffusive O2 transport (<1 mm in normoxia). Quantitative PCR (qPCR) was used to identify changes in hemoglobin isoform mRNA expression after acute (48-h) exposure to 2 concentrations of Pb combined with 2 levels of hypoxia.

PO15. Anti-Obesity Activities of Natural Dietary Products in the Human Liver Cell Line HepaRG and Human Adipocytes.

Sanjanaa Senthilkumar[1], Megan Solan[1], Ramon Lavado[1]
[1] Baylor University

An increasing number of diseases related to insulin resistance and obesity is an alarming problem worldwide. Novel therapeutic methods are constantly sought to prevent, treat, and alleviate symptoms of the diseases mentioned above. This study investigates the effects of three natural compounds (indole-3-carbinol, I3C, a bioactive indolic compound found in cruciferous vegetables, such as broccoli; cannabidiol, CBD, the active ingredient in cannabis-derived from the hemp plant; and trans-resveratrol, TRV, a natural compound present in grapes, red wine, and berries with anticancer properties) on the fatty acid accumulation in the human liver cell line HepaRG, a well-established model for non-alcoholic fatty liver disease (NAFLD) and in human pre-adipocytes (adipose-derived mesenchymal stem cells). LC50s of each compound were in the high uM range (around 30 mg/L), showing the low toxicity of these compounds. Effects on Hepa-RG cellular lipids revealed significant lipolysis and prevention of fatty acid accumulation when exposed to sublethal concentrations (at nM level) of I3C and CBD. The same effect was observed on MSC cells: a significant inhibition of lipogenesis and adipocyte differentiation was observed in cells exposed to nM levels of I3C and CBD. No apparent effect was observed with TRV. This study provides a significant contribution to advancing the understanding of preventative dietary strategies that target NAFLD.

PO16. Detection of Bacterial Pathogen in the American Oyster, *Crassostrea virginica* in South Texas Waters.

Wendy Martinez[1], Mohammad Maruf Billah[1]
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The American oyster, *Crassostrea virginica*, is an edible and commercially important marine species in the United States. People who eat raw oysters can get infected from pathogenic bacteria. The bacterial pathogens rapidly facilitate the transmission of infectious diseases to seafood consumers. The American oyster represents a risk to the public health in polluted waters due to anthropogenic contamination in South Texas region. Specifically in Brownsville waters that receives municipal and industrial drainage runoffs. The objective of this study is to investigate an important bacterial pathogen, *E. coli* (*Escherichia coli*) in the American oyster in Brownsville waters. Oysters were collected from San Martin Lake and South Padre Island and transported to the laboratory. Gills and gonadal tissues were removed from body cavity and fixed in 4% Paraformaldehyde (PFA) at 4°C for immunohistochemical detection of bacterial pathogens. We also collected water samples in sampling sites and detected bacterial pathogen using *E. coli* detection kit. Our immunohistochemistry results clearly showed that E. coli was not just within the lumen of gut but also in digestive gland, gills, and connective tissue of oysters collected in San Martin Lake and South Padre Island. Collectively, our histological and immunohistochemical results suggested that the American oyster is prone to water-borne pathogen in Brownsville waters.

PO17. Effects of Polystyrene Microplastics on Mosquito Life History Traits.

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Plastic pollution in aquatic and terrestrial ecosystems has become a global issue. While ingestion of large plastics by vertebrate animals has been demonstrated to result in adverse physiological effects, there is little data on the effects of ingestion of microplastics, smaller than 5 µm, on invertebrates. In this study, the effect of microplastic ingestion was examined on two container inhabiting medically important mosquito species, Aedes albopictus and Aedes aegypti. Instead of natural bodies of water, these mosquitoes prefer to deposit their eggs in containers of water (e.g., discarded tires, birdbaths, plastic bottles), which are likely to harbor secondary microplastics. We hypothesize that ingestion of microplastics will lead to changes in adult emergence rates, survivorship, longevity, hatch rates, and fecundity of mosquitoes. To examine for the effect on life history traits of Ae. albopictus and Ae. aegypti, larvae were fed environmentally relevant concentrations of polystyrene beads; adult emergence, survivorship, longevity, and fecundity measures were compared to larvae reared in the absence of microplastics. The results are discussed in relation to how changes to life history traits as a result of juvenile microplastic ingestion could potentially alter vector competence and arboviral disease transmission.

PO18. Marine medaka *Oryzias melastigma* as a model for PFOS-induced developmental immunotoxicity.

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According to the hypothesis of developmental origins of health and diseases, environmental exposure of the developing immune system in embryos, newborns and children is more susceptible to trigger immune pathologies. However, knowledge regarding critical windows during innate immune development is still lacking in vertebrates. The marine medaka *(Oryzias melastigma*), a model for immunotoxicity, is proposed to develop a timeline for innate immune system development. Expression of innate immune initiators (C1q, TLR5-soluble), mediators (MYD88, M-CSF) and effectors (LYZ) revealed developmental changes between 9-11 days post fertilization (dpf). C1q, TLR5-soluble, MYD88 and M-CSF were significantly downregulated, and LYZ was significantly upregulated at 11 dpf. Susceptibility during 9-11dpf was tested via PFOS/PFHxS exposure from 0 dpf-hatching (embryonic stage) and 0 days post hatching (dph)-14 dph (larval stage) at 5 concentrations (0-50ng/L), equivalent to those found in prenatal/fetal blood. A host resistance assay with *Edwardsiella piscicida* indicated PFOS (5, 50 ng/L)-induced immune impairment, while PFHxS exposure had no effect. PFOS exposure survival was 20-40% lower compared to the control. The larval stage was observed to be more susceptible to PFOS/PFHxS and subsequent pathogen exposure than the embryonic stage. These data provide new insights for future research focused on critical windows and developmental immunotoxicity to improve risk assessment of PFAS substances.

PO19. *In Silico* simulations of Benzo[a]pyrene docking to Histone Lysine Demethylase and Histone Deacetylase 7.

Hunter Chung[1], Subham Nag[1], Cesar Marquez[1], Frauke Seemann[1]
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There is evidence that environmental Benzo[a]pyrene (BAP) is a transgenerational toxicant. Exposures of zebrafish (*Danio rerio*) and Japanese medaka (*Oryzias latipes*), resulted in cardiovascular, neurobehavioral and bone tissue impacts in the offspring. Preliminary data indicate an involvement of epigenetic mechanisms, DNA methylation and histone modifications, with a possible role of Histone Lysine Demethylase (KDM5B), a histone demethylase, and Histone Deacetylase 7 (HDAC7), a histone deacetylase. KDM5B catalyzes H3K4 methylation in sperm during fertilization and early embryonic development. HDAC7 regulates acetylation of H3K9 and H4K17 and is required for DNA stability in gametes. In a series of *in silico* simulations, the interaction of the BaP metabolite Benzo[a]pyrene diol epoxide (BPDE) with these two enzymes was assessed via docking studies to identify possible high affinity regions for BPDE binding and molecular dynamics to evaluate conformational and functional impacts of BPDE binding to the enzymes in their active and inactive forms. BPDE is binding to the amino acids surrounding the Zinc region of the active site in KDM5B and is hydrogen bonding between two proteins within the HDAC7. Our data indicate that ancestral BaP exposure may impact the germ cells and embryonic epigenetic profile through modified KDM5B histone demethylation activity and affected HDAC7deacetylase activity, thus possibly initiating the transgenerational phenotypes observed in small fish.

PO20. *In silico* Docking Analysis Reveals Differences of Benzo[a]pyrene Metabolite Binding on Active Domains of Gene Silencing Enzymes PRC1, PRC2, DNMT3A and DNMT3B.

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The environmental pollutant, Benzo[a]pyrene (BaP), found in tobacco and petroleum, has been shown to induce transgenerational toxicity in laboratory fish. Inheritance of a modified epigenetic pattern through the germ line is suspected to be the underlying mechanism of BaP-induced transgenerational toxicity. To elucidate the interaction of ancestral BaP-exposure with epigenetic mechanisms, *in silico* docking and molecular dynamics analysis were conducted. The interaction of the BaP metabolite Benzo[a]pyrene-7,8-diol-9,10-epoxide (BPDE) and the active domains of the polycomb repressive complex 1 and 2 (PRC1; PRC2) and DNA methyltransferase 3 A and B (DNMT3A; DNMT3B), which are both involved in gene silencing, were examined. PRC1/2 catalyze the methylation of lysine 27 on histone 3 with a major role in cell fate decisions, while DNMT3A/B regulate de-novo DNA methylation in germ cells and maternal imprinting in the embryo. Our results indicate that BPDE binding tends to be stereospecific in the enzymatically active EED's WD 40 domain of PRC1/2, while binding was not stereospecific in the SET and SANT2L domain, a region required for enzyme binding to the histone 3 tail. For DNMT3A/B, BPDE binding is expected to occur in the catalytic loop and the target recognition domain modifying CpG nucleotide recognition. This study will shed light on the potential mechanisms of ancestral BaP exposure-induced impact on the epigenetic profile in the offspring.

PO21. *In Silico* Docking Analysis of BPDE on Lysine Methyltransferases 2A and 2C.

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Benzo[a]pyrene (BaP) is an environmental toxicant commonly released by oil spills that has been shown to cause inheritance of a modified bone phenotype in the offspring of exposed organisms. Our research and others indicate that epigenetic changes are a possible cause for the BaP-induced inherited bone deformity. Preliminary data revealed a reduced di-methylation of the 4th lysine on the H3 tail (H3K4me2) in ancestrally BaP-exposed offspring. Here we investigate the potential impact of BaP-exposure on Lysine Methyltransferase 2A and 2C (MLL1; MLL3) integrity and function. Both are major enzymes to regulate H3K4 methylation. To gain an understanding how BaP may be interfering with the function of MLL1 and MLL3, an array of *in silico* docking experiments were performed on crystal and cryo-EM structures of the MLL1 and MLL3 complexes. Isomers of the BaP metabolite Benzopyrene-7,8-diol-9,10-epoxide (BPDE) formed hydrogen bonds with the MLL1 and MLL3 SET domains responsible for methylating H3K4. In addition, BPDE bound to the central region of the RbBP5 protein of the MLL complexes, possibly affecting efficient methyltransferase activity. These findings suggest that BPDE can inhibit the function of the MLL complexes possibly resulting in a modified epigenetic profile in the gametes and changed offspring bone phenotype upon parental BaP-exposure.

PO22. Prioritizing organic contaminants and locations of ecological concern using sediment and water from Lower Rio Grande Valley resacas.

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Little is known about emerging and legacy contaminants in resacas along the US-Mexico border in the Lower Rio Grande Valley, Texas, and their impacts on ecosystem biota. Nearly 75% of the region's wildlife habitat has been replaced by human development and agriculture, leading to increased concern about contaminants and the impacts they have on wildlife and human health. The goal of this study is to identify and characterize contaminant loading along select resacas along the US-Mexico border and their effects on aquatic organisms. Sediment and water samples were collected at 13 different sites from resacas. Chemical analyses of 100 non-point source pollutants were assayed in sediment, with PAHs, PCBs, pyrethroids, and organochlorines found in sediment at most sites during spring, summer, and fall seasons. Chemical analysis via LC-MS and GC-MS reported varying concentrations dependent on rain events with high concentrations of PAHs and PCBs in spring/summer and fall, respectively. TEQs were calculated from sediment PAH and PCB data indicating toxicity at sites 9 and 10 (urban) during spring and summer and sites 2 and 12 (peri-urban) during fall. Zebrafish larvae behavior and morphological malformations formed from sediment extracts was assessed at 5dpf at each site during all three seasons. Toxicity data for zebrafish will be presented as part of a toxicity identification evaluation for prioritization of organic contaminants of concern.

PO23. In-silico computational chemistry assessment of nucleosome alterations in response to Benzo[a]pyrene metabolite exposure.

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Benzo(a)pyrene (BaP) is a toxicant found in petroleum and cigarette smoke. Exposure to environmental concentrations resulted in transgenerational phenotypes in laboratory fish models. These BaP and BaP-metabolite induced offspring phenotypes may originate from a modified epigenetic profile in the germ cells. Preliminary data indicate that both, DNA methylation and histone tail modifications are involved. Histone tails are dynamic in structure and position, and stabilize the coiled DNA, recruit epigenetic enzymes, and configure the chromatin architecture. The possible mechanism by which the BaP metabolite Benzo(a)pyrene diol-epoxide (BPDE) could alter the nucleosomal profile were assessed with *in silico* docking experiments. The analysis of different nucleosome conformations revealed possible BPDE docking sites in the histone 3 tail latch region with competitive hydrogen bonding. Thus, docking of BPDE may affect tail movement and function. Molecular dynamics computations were used to assess any changes on nucleosome integrity and function. The conformational flexibility of the H3 tail was impacted through BPDE binding, possibly affecting accessibility for epigenetic enzymes, interaction with nucleosomal DNA and chromatin signaling and structure. Disrupted histone tail modifications are associated with several human diseases. The *in silico* data will provide new insight into the toxicity of BaP and its potential to impact the epigenetic profile over generations.

PO24. Evaluation of the in vitro toxicity of indole derivatives: gut bacteria metabolites that may contribute to the etiology of human diseases.

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Over the past two decades, research interest on the interactions between diet, gut microbiota, and their host organism has grown. New data suggest that tryptophan, an essential amino acid, can be metabolized by microbiota, leading to the synthesis of a biologically active group of indoles. Evidence indicates that indoles derived from gut microbiota metabolism exert significant biological effects. However, most of the research is limited to experimental studies, and most of the data is focused mainly on the actions of indole, and its liver metabolite, indoxyl sulfate. This study was designed to explore the cytotoxic effects of five indole derivatives, indole-3-carboxylic acid (I3CA), indole-3-aldehyde (I3A), indole-3-acetic acid (IAA), indole-3-propionic acid (IPA), and 3-methylindole (skatole, 3-MI), on two relevant human cell lines representing different tissues, the adipose-derived mesenchymal stem cells (MSC) and the liver cell line HepaRG. While I3CA, IPA, and 3-MI were highly cytotoxic to MSC cells (LC50s ranged from 0.2 to 1 ÂµM), they showed low toxicity in hepatocytes (LC50s were higher than 50 µM). I3A showed high toxicity in both cell types, but significant differences were observed for IAA: very low toxicity in MSC cells (LC50>100 µM) and increased toxicity in HepaRG cells (LC50=2.21+/-0.32 µM). This study evidenced that indole and its derivatives may exert a cytotoxic effect in selected cell types like stem cells, and that effect is indole- and cell-type dependent.

PO25. Optimization of bone cell extraction from larvae and juvenile Japanese medaka (*Oryzias latipes*) for cryopreservation.

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The prevalence of bone diseases like osteoporosis is increasing globally due to exposure to triggers like Benzo[a]pyrene (BaP). Isolation of specific bone cells is necessary for further omics applications and cell profiling to identify mechanisms of cellular level changes related to BaP exposure both direct and transgenerational. Here we propose a modified and specified method of cell extraction from larvae (0-3 months) and juvenile (3-6 months) Japanese medaka (*Oryzias latipes*) transgenic bone cell lines. Bone tissue was isolated, and bone cells were extracted as described in Buettner et al., 2015. The dissociation mix containing collagenase, trypsin/EDTA, and PBS was modified to maximize cell viability for each age group. A mix of 0.15% collagenase, 0.25% trypsin/EDTA, and 99.6% PBS obtained an average total viability of 89% for larval samples while a mix of 0.5% collagenase, 1% trypsin/EDTA, and 98.5% PBS obtained an average viability of 70% for juvenile samples. After extraction, the method of cryopreservation was optimized by evaluating Hanks' Balanced Salt Solution (HBSS), Leibovitz (L15), and PBS as potential reagents for use in the cryopreservation medium. The optimized protocol resulted in 96% viability of the preserved cells using a medium of 10% DMSO, 10% heat-inactivated FBS, and 80% L15. Both cell extraction and cryopreservation methods described here will allow for cell specific-analysis post-BaP exposure and the identification of potential targets for risk assessment.

PO26. Microinjection of Benzo[a]pyrene-associated mir-199a in transgenic Japanese Medaka (*Oryzias latipes*).

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Debilitating bone diseases such as osteoporosis are a rising concern worldwide. Benzo[a]pyrene (BaP), a toxicant known to have transgenerational effects on bone integrity, has been linked to specific microRNAs (miRNAs) in previous research. To further understand the role of microRNAs associated with BaP induced bone deformities, a double transgenic strain of *Oryzias latipes* embryos was injected with custom made mir-199a oligos. Mir-199a is associated with Sox9a/b gene expression in bone maturation. Changes in bone maturation have been visualized every third day until 30dpf. Fluorescence area and intensity were measured for both Col 10 positive (green fluorescence+, gfp+) and Osx positive (red fluorescence+, rfp+) bone cells. The fluorescent intensity of rfp+ cells was significantly increased in fish injected with mir-199a, while no change was observed in gfp+ intensity. This data indicates that the injection of mir-199a and related increase in expression of Sox9a/b results in an increase of Osx positive bone cells which are considered fully mature osteoblasts. Data provided here will aid in further understanding of the function of BaP associated miRNAs and the transgenerational effect of BaP exposure aiming to identify potential targets and treatments related to bone diseases.

PO27. Derivation and verification site-specific sediment quality benchmarks using AVS/SEM and EqP approaches.

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Florida has adopted sediment quality assessment guidelines (SQAGs) for use statewide. Like many states, Florida's SQAGs are based on consensus-based thresholds developed by MacDonald et al. (2000) supplemented with additional thresholds from the literature. These SQAGs generally provide for a conservative approach for protecting aquatic life in Florida. However, these SQAGs are generic and non-site-specific, lacking the relevant application of organic carbon (OC) concentrations, sediment grain size, and concentrations of acid volatile sulfides (AVS) and simultaneously extracted metals (SEM). In some cases, the conservatism of the SQAGs would indicate significant remedial action is warranted, however, the site- specific conditions suggest otherwise. Formation worked with the South Florida Management District to explore the applicability of site-specific OC and equilibrium partitioning (EqP) methods as well as AVS/SEM to derive alternative sediment quality benchmarks (SQBs) for benthic invertebrates for a range of contaminants commonly encountered on District water resource projects. The site-specific SQBs were then validated using site-specific sediment chemical analysis and toxicity testing. Eight metals and seventeen organo-chlorine pesticides (OCPs) were evaluated. Overall, the derived SQBs were found to be more reliable than SQAG thresholds particularly in areas of high organic carbon sediments such as former sugarcane farms where OC can be as high as 50%.

PO28. Accumulation of Micro and Nanoplastic Particles in *Biomphalaria Glabrata* (*Mollusca, Gastropoda, Planorbidae*) Eggs and the Subsequent Effects on Embryonic Development.

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Gastropods are used in toxicity checks due to their sensitivity. Studies on accumulation of environmental waste and toxic effects on embryonic stages of Gastropods are limited.This study uses *Biomphalaria glabrata* embryos to reveal the deposit and toxic effects of micro/nanoplastic particles (MNPs). The goal is to find the link between the sizes of MNPs, their accrual in B. glabrata embryos, and toxicity. The embryos were laid in a laboratory setting and treated with 1.0 ppm of various sizes of fluorescent polystyrene MNPs (0.03 µm, 0.5 µm and 1.0 µm). The absorption of the MNPs was assessed by measuring fluorescence in the water after treatment. Toxicity of PNPs to the growth of the embryos was assessed through gene expression of stress response markers, development assays, mortality, and hatching rate of embryos. To study transgenerational effects; mortality and changes in gene expression are seen in the brood of the Parental (P) generation that was treated to 0.03, 0.5, and 1.0 µm MNPs at 10ppm during their embryonic stage. The data showed the presence of MNPs during embryonic growth increased death and hatching rates. Fluorescent imaging showed the MNPs accrue on the surface of egg masses and increase over time. Treated samples show an increase in death and defects compared to the untreated. Genetic responses to MNPs were assessed using qPCR on biological, xenobiotic and stress-response genes.This shows that smaller MNPs have severe impacts on the growth of Gastropod embryos.

PO29. Responses of Shellfish Calcification under Ocean Acetification in Primary Mantle Culture from Eastern Oyster *Crassostrea virginica.*

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As a result of human activities, global CO2 is continuously increasing. Due to the increased absorption of CO2 from the atmosphere, the pH of the ocean surface will further decrease. There is already strong evidence that bivalve populations, which play essential roles in the estuarine ecosystems, are threatened by acidification. The low pH is causing the reduction in calcium deposition in shells, incompletion of shell formation, and declines in the larval settlement. Mantle tissue in bivalves has been demonstrated participating in the shell formations by synthesizing and transporting CaCo3 crystals. In this study, we expect to establish a primary mantle culture system from *Crassostrea virginica* to explore the genetic response of mantle cells to ocean acidification stress. The cells will be treated with different pHs (8.2, 7.8, and 7.4) using different concentrations of NaHCO3 after 24-hour culturing to simulate ocean acidification environments for 8-16 hours. RT-PCR will demonstrate the mantle cells to express calmodulin, caltractin, calreticulin, and calnexin. The changes of Ca2+ concentration and above proteins under different treatments are expected to be visualized and quantified under a fluorescent microscope. This research will help investigate the pathway of shell formation and the impact of ocean acidification on marine bivalves. It also provides a tool for assessing the rapid environmental risks to bivalve biomineralization at the cellular level.

PO30. Reduction in cell proliferation due to phototoxic effects of PAHs in oyster cardiomyocyte primary cell culture.

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Primary cardiomyocyte cultures were produced from live Eastern oysters (*Crassostrea virginica*) collected from Aransas Bay, TX to test the phototoxic effects of the polycyclic aromatic hydrocarbons (PAHs) Anthracene and Pyrene on cell physiology. PAH emulsions were produced using DMSO as a solvent and then diluted using DI water. Photodegradation of the Anthracene and Pyrene emulsions was performed using the Suntest CPS+ for 0, 6, 12, and 24 hours. The degradation products were then diluted into the cell culture medium to reach a final concentration of 1 and 0.1 ppm. Contrary to the findings of Xu et al. (2018), no significant differences in beat frequency of cell clusters was detected among the different treatments. Immunofluorescence marking of Ki-67 and Cardioactive B proteins, however, revealed significant reduction in cell proliferation and contractile activity in culture media treated with photodegraded PAHs.

PO31. Detecting the Emerging Contaminant Amphetamine in the Apex predator *Alligator mississippiensis*: A Novel Study.

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The Gulf of Mexico is a vast area that includes many different habitats such as mangroves, estuaries, and swamp lands. This area includes both highly urbanized areas and more remote areas. Many studies of environmental contaminants cover substances such as pesticides, pharmaceuticals, and personal care products. However, in more recent years a new class of contaminant is starting to surface: illicit drugs. This study focuses on the detection of such contaminants, specifically amphetamine, MDA, MDEA, MDMA, and methamphetamine, in the keystone species *Alligator mississippiensis* collected from the Houston, TX area and the Rockefeller Wildlife Refuge in Grand Chenier, LA. *A. mississippiensis* are of particular interest as they are not only apex predators, but they are considered environmental indicators as well as trophic regulators. Given that this species is a highly opportunistic predator, it is suggested that there may be a potential of this chemical transferred to this apex predators through environmental exposure and/or trophic transfer through contaminated prey items. This study utilizes tissues adipose, liver, and scutes collected from alligators in the Houston, TX area and the Rockefeller Wildlife Refuge in Grand Chenier, LA. Tissues were homogenized and processed using QuECHERS salt extraction methods. Chemical analysis using liquid chromatography-mass spectrometry (LC-MS) indicate that amphetamine was found in alligator adipose, liver and scute tissue at both locations in the range of 2-17 ppb. This study will highlight the use of non-invasive scute data in determining narcotic concentrations in an apex species.