National Institute of Environmental Health Sciences

The University of Texas Health Science Center at Houston

Baylor College of Medicine

Training in Precision Environmental Health Sciences (TPEHS)

Program Director: **Cheryl Walker,** PhD, Director, Center for Precision Environmental Health
Professor, Molecular & Cell Biology, and Medicine, Baylor College of Medicine
Program Co-Directors: **Richard Finnell**, PhD, Professor and Chair
Pharmacology, Baylor College of Medicine; **Craig Hanis**, PhD, Professor, Epidemiology Human Genetics & Environmental Sciences, and Human Genetics Center, School of Public Health, UT Health Science Center at Houston and; **Rui Chen**, PhD, Professor, Molecular and Human Genetics, Baylor College of Medicine

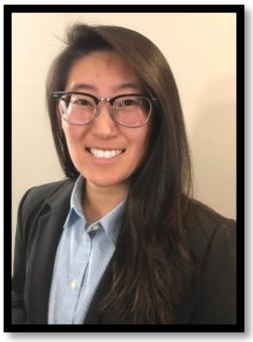
http://www.gulfcoastconsortia.org/home/training/training-in-precision-environmental-health-sciences-tpehs/

Meet the Trainees

Cohort 1, Appointed January 1, 2019

MacKinsey Bach
Epidemiology, Human Genetics and Environmental Sciences (EHGES), University of Texas Health Science Center - Houston
Primary Mentor: Dr. Laura Mitchell, EHGES, UTHealth
Secondary Mentor: Dr. Mohammad Rahbar, EHGES, UTHealth
Effects of the Maternal Genome on Risk of Autism Spectrum Disorder: Utilization of Whole Genome Sequence Data for Genome-Wide, Gene-Based Analyses and Genetic Risk Scores
The etiology of autism spectrum disorder (ASD) is still largely unknown, with most cases likely resulting from combinations of genetic and environmental exposures. The maternal genome and preexisting maternal metabolic conditions modulate the fetal environment and thus potentially contribute to ASD risk and severity in her children, though prior studies on these types of maternal exposures have produced inconsistent results. Using whole genome sequencing data from the Simons Simplex Collection, I will use a genome-wide gene-based approach and analysis of maternal genetic risk scores for hypertension, obesity, and diabetes to investigate the role of the maternal genome in ASD. I will also explore interactions between maternal genes and/or GRS for these conditions and other exposures that can affect the fetal environment, such as substance use, age of the parents, the child's sex, and the child's genes, in relation to ASD.

Marzia Savini
Developmental Biology, Baylor College of Medicine
Primary Mentor: Dr. Meng Wang, Molecular and Human Genetics (BCM)
Secondary Mentor: Dr. Christophe Herman, Molecular and Human Genetics (BCM)
Tissue Cross-talk in Longevity Mechanism Regulation
The rate of aging can be modulated by nutritional, environmental and metabolic cues. How those signals are coordinated among different tissues is a fundamental question for understanding aging regulation. Recent work in our lab demonstrated that the intestine-specific induction of a lysosomal acid lipase *lipl-4* increases *C. elegans* lifespan by more than 40%. My project aims to identify through nutritional screening how the signal from the intestine (where *lipl-4* functions) is transmitted into the neurons (where the neuropeptide functions). I expect that my project will reveal novel regulatory mechanisms of longevity and diet-fat-neuron crosstalk, and have a broad impact on human health.



Lythou Melody Yeo
Biochemistry and Molecular Biology, Baylor College of Medicine
Primary Mentor: Dr. Richard Finnell, Center for Precision Environmental Health (BCM)
Secondary Mentor: Dr. Philip Lupo, Pediatrics (BCM)

Establishing a Genetic Marker of Risk for Anti-Epileptic Drug Valproic Acid-Exposed Pregnancies

Anti-epileptic drugs (AEDs), despite having a well-established teratogenic potential, continue to be prescribed to women of reproductive age, leading to an elevated risk of adverse pregnancy outcomes such as neural tube defects (NTDs). In an effort to better manage AED-complicated pregnancies so as to prevent preventable birth defects, the goal of my proposed project is to identify a genetic signature of risk for mother-infant pairs exposed to valproic acid (VPA), the most commonly prescribed AED globally, through a two-pronged approach. The first approach will be to elucidate the complex genomic etiology of NTDs by using next-generation DNA sequencing to identify genetic variants that modify susceptibility to VPA-induced NTDs. The second phase of the proposed project is to understand the mechanism of action (MOA) underlying VPA teratogenesis through investigation of the role of reactive oxidative stress (ROS) in disrupted embryogenesis, as it is a crucial part of numerous essential developmental signaling cascades. Together, the results of these interdisciplinary approaches will pave the way towards vastly improved genetic counseling and management of VPA-exposed at-risk mothers, illuminate the mechanism through which AEDs impair embryogenesis, and promote the future development of non-teratogenic AEDs.

The TPEHS program is Administered by the:
Gulf Coast Consortia
QUANTITATIVE BIOMEDICAL SCIENCES

www.gulfcoastconsortia.org
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The GCC is a collaboration of:
Rice University
Baylor College of Medicine
University of Houston
University of Texas Health Science Center at Houston
University of Texas Medical Branch at Galveston
University of Texas MD Anderson Cancer Center
Institute of Biosciences & Technology at Texas A&M Health Science Center