Multigenerational Impacts of Dietary Exposure

Polybrominated diphenyl ethers (PBDEs) are persistent, ubiquitously detected in environmental matrices including humans, and known to cause a variety of adverse health effects. Effects of environmental exposures can propagate across generations through various mechanisms, including altered maternal provisioning, maternal transfer of contaminants, and epigenetic transgenerational inheritance. I propose to use Atlantic killifish (Fundulus heteroclitus) as a vertebrate model system to test for multigenerational impacts of dietary exposure to BDE-99. We exposed adult killifish to a range of BDE-99 concentrations through diet. Preliminary results indicated that energetic reserves were affected and reproduction was significantly reduced by BDE-99 at all tested doses. I will build upon these results using RNA sequencing (RNA-Seq) to characterize the molecular mechanisms and pathways involved. I plan to lead a follow-up dietary exposure with BDE-99 to test for multigenerational and transgenerational impacts with an experimental design that will distinguish maternal provisioning or transfer from genomic imprinting. In each generation, genome-wide gene expression will be profiled using RNA-Seq. Anchoring patterns of gene expression to phenotypic and behavioral measurements will guide functional annotation enrichment and pathway analyses, and will serve to reveal mechanisms of response to BDE-99 exposure and impacts of transgenerational inheritance.