

NIEHS T32 Abstract:

Type 2 Diabetes Mellitus (T2DM) is a prevalent disease affecting over 14% of adults worldwide. It is increasingly recognized that environmental pollutants may be playing an important role in metabolic health. Specifically, traffic related air pollution (TRAP) is associated with increased risk of T2DM. Epidemiological studies and meta-analyses show that TRAP exposure increases the odds of developing diabetes. Further, preclinical and clinical studies report an association between TRAP exposure and impaired pancreatic islet function. However, the mechanisms by which TRAP increases the risk of metabolic disease are poorly defined. Therefore, I propose to investigate the impacts of TRAP on pancreatic islet health in rats in the context of metabolic stress. In order to do so, rats will be placed on a low fat or high fat diet and will receive unaltered TRAP from a highly trafficked tunnel or filtered air. After 6 months of exposure I will be assessing islet morphology and beta cell maturity between TRAP and filtered air exposed groups. I hypothesize that under conditions of metabolic stress, TRAP will impair pancreatic islet function by decreasing beta-cell maturity. With the combination of these parameters, I hope to provide new insight to the field on islet impairment during TRAP exposure in order to implement preventative measures that lessen TRAP exposure and disease.