

“From Mother to Baby: Blocking Lung Disease and the Epigenetic Changes in Childhood Caused by Maternal Smoking During Pregnancy”

PI: Cynthia McEvoy

Abstract

We are requesting Catalyst funding to assemble, maintain and characterize a unique cohort of offspring of mothers who smoked and were randomized to supplemental vitamin C or placebo during pregnancy, and to profile their DNA methylation patterns from birth to childhood in relation to the vitamin C intervention and asthma development. Smoking during pregnancy remains a major problem with at least 12% of women smoking during pregnancy. Children whose mothers smoked during pregnancy show lifetime decreases in pulmonary function and increased asthma risk. Our data in animal and human studies strongly supports that the lifelong consequences of this in-utero exposure can be lessened by maternal vitamin C supplementation. The objectives of this proposal are: 1) to create, maintain, and follow the clinical cohort assembled from a completed K23-trial which randomized 159 pregnant smokers to vitamin C (500 mg/day) versus placebo (and studied 70 non-smokers), and from an ongoing R01 randomizing pregnant smokers to vitamin C versus placebo; 2) to investigate altered epigenetic profiles of DNA methylation that may predict disease susceptibility using biospecimens collected at delivery, 3 months, 12 months, and ages 2-7 years to measure global and gene specific DNA methylation. During the Catalyst (9/1/13 - 8/31/14) we will collect cross-sectional samples on 188 patients from the K23 (age range of 2-7 years old) and delivery samples on 120 patients and 3 month samples on 80 patients from the ongoing R01. This data will support a planned application to NIH PAR-13-109 "Mechanistic Insights from Birth Cohorts" planned for October 2014.