NCS Research Day Poster Abstract
Pacific Northwest Center for the National Children's Study (PNWNCS)

Pharmacogenomic Marker Analysis for NCS Gene Time Environment Evaluation: A Feasibility Study

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This formative research project is identifying and optimizing "state of the art" methods to analyze pharmacogenomic responses to environmental exposure. Knowledge about individual genetic variability in terms of polymorphisms can improve our ability to predict and characterize variation in health responses after environmental exposure. Pharmacogenomic markers have been identified using the Affymetrix Drug Metabolizing Enzyme & Transporter (DMET) genotyping platform. This microarray-based, SNP genotyping system can genotype 1936 variations, including SNPs and in-dels, in 225 genes involved in xenobiotic metabolism and disposition using a single array. Using this genotyping approach, we examined in another children's longitudinal cohort study (Center for Child Environmental Health Risks Research) the pharmacogenomic variability in 60 households consisting of Hispanic farmworkers and non-farmworkers. Each household consisted of an adult and child pair. DNA was isolated from buffy coat samples collected from adults and buccal swabs obtained from the children. Buccal DNA was amplified using a whole genome amplification approach in order to produce sufficient material for genotyping. Genotype call rates were high (>99%) and allele frequencies for two groups of genes, CYP450s and GSTs, were in concordance with results from other analyses of Hispanic populations. When combined with other biomarker data, we observed differential risk of acetylcholinesterase inhibition after exposure to organophosphate pesticides based on genotypes for key CYP450s related to the metabolism of these compounds. These results demonstrate the utility of the DMET technology for gene time environment studies with field-collected samples, including those obtained non-invasively. These observations will prove useful in evaluating gene-environment interactions in the etiology of childhood disease in the NCS main study.