

**Consortium on Law and Values in Health, Environment & the Life Sciences**  
**Award Report for the 2016-17 Academic Year**

“Maternal Pre-Pregnancy Body Mass Index (BMI) and Infant Neurodevelopment”

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**Project Summary**

The aim of the current study is to test the association of pre-gravid maternal obesity with patterns of infant brain function that index recognition memory ability and perceptual processing. These outcomes were chosen because the brain structures underlying these functions are hypothesized to be at risk from maternal inflammatory states. The specific hypotheses to be tested are 1) Maternal obesity is associated with poorer hippocampal-based electrophysiology outcomes, and slower myelination-dependent speed of processing at one and six months of age; 2). Maternal obesity is associated with an increased state of inflammation (as indexed by levels of pro-inflammatory cytokines in breast milk); 3). Maternal BMI, breast milk inflammatory markers, and infant brain function are correlated with distinct infant gut microbial community features. We predict that infants in the high maternal BMI group will demonstrate altered ERP responses to stimuli and that these alterations are associated with increased inflammatory marker concentrations in breast milk and altered bacterial community features as compared to infants in the normal maternal BMI group.

**Results**

As of July 2018, 153 infants have been enrolled in this study of pre-gravid maternal obesity and infant neurodevelopment. Of the 153 enrolled infants, all have completed the 1-month session, and 150 have completed the 6-month session. Thus far, 114 infants have contributed acceptable electrophysiological data at 1 month, and 66 infants have contributed acceptable electrophysiological data at 6 months. Breast milk and fecal samples have been collected from all enrolled infant/mother dyads at both 1 and 6 months. All study visits will be completed by August 2018. Cross-sectional analysis of 1- and 6-month electrophysiological data is nearly complete; longitudinal analysis of electrophysiological data will occur after all project data is collected. Milk and fecal sample processing is underway and expected to be concluded by October 2018. Analysis of project data will be completed by January 2019, and I plan to use these data for my culminating experience and prepare the data for publication in spring 2019.

**Future project plans**

These funds allowed us to dramatically expand our enrollment to better understand the possible relationship between maternal obesity, inflammation, and infant neurodevelopment. These data will be used for my MPH culminating experience in spring 2019 and will be submitted for publication. Furthermore, pilot data from this project were used to support an R21 grant application in June which will further explore the development of infant microbiota and its relationship to neurodevelopment.