Interdisciplinary Research Grant
2017 Round 2

Project Summary

Participating Faculty

1. Lead PI
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2. Additional PI
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Project Title: The role of choline in reducing perinatal stress and improving birth outcomes of gestational diabetes in a high-risk urban population

Summary (200 words maximum):
Gestational diabetes mellitus (GDM) results in adverse birth outcomes including macrosomia (fetal overgrowth), which predisposes infants to cardio-metabolic diseases in adulthood. Pregnant women living in socioeconomically-disadvantaged urban neighborhoods are susceptible to GDM partly due to neighborhood and household stress factors such as violence and food insecurity. Perinatal stress exacerbates maternal hyperglycemia and placental glucose overflow to the fetus. Our previous studies suggest that the nutrient choline decreased placental and fetal stress hormones in healthy pregnancies and prevented GDM-induced fetal overgrowth in mice. This proposal aims to determine the influence of choline on perinatal stress and GDM birth outcomes in women from a disadvantaged neighborhood. We will recruit GDM and control pregnant women (n=30/group) from East Flatbush, Brooklyn and assess their choline intake/status and stress during pregnancy. We will analyze the correlation of choline with stress and birth outcomes. Using placental cells from participants, we will determine the causative effects of choline on placental functioning via in vitro assays. We hypothesize that low choline status is associated with adverse birth outcomes, whereas choline supplementation normalizes macronutrient metabolism of placental cells. This study will provide insights into the use of choline as a low-cost treatment to improve GDM outcomes in urban populations.