Connecting Vitamin D to Gene Expression in Pregnant African Americans

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Abstract

• Vitamin D potentially plays a role in maternal health outcomes partly through the regulation of genes linked to vital physiologic processes.

• This study investigates the relationship between serum vitamin D and gene expression in peripheral blood mononuclear cells of pregnant African Americans.

Methods

• In this prospective, longitudinal study a cohort of women residing in the metropolitan area of Atlanta, Georgia were recruited from March 2014 to June 2018.

• Inclusion criteria included self-identification as African American, being between the ages of 18-40 years, and a current singleton pregnancy.

• The samples for this analysis were collected between 6-15 weeks gestation.

• Gene expression was assessed using the HumanHT-12 v4 BeadChip (Illumina).

• Vitamin D was measured as Total 25(OH)D with the iSYS automated chemiluminescent assay (Immunodiagnostics Systems, Fountain Hills, AZ).

Results

• A total of 104 women were included in this study.

• The average total 25(OH)D of this sample is 22.7ng/mL.

• Of the 16, 258 transcripts analyzed 7.5% (2,154) of them show significantly different expression at p < 0.5.

• Some of these genes reflect pathways that include both innate and adaptive immune function.

• There are overlapping genes with this and previous studies of vitamin D in multi-ethnic, pregnant cohorts.

Summary and Conclusions

• Our data suggests that gene expression is related to maternal vitamin D levels.

• While studying vitamin D levels in early pregnancy allows for insight into some of its initial influence on pregnancy, future studies could be enhanced by additional time points across gestation and even in offspring.

• The immune pathways highlighted in this research can inform future investigations of maternal health outcomes related to altered immune states including bacterial vaginosis, pre-eclampsia, and preterm birth.

• Vitamin D deficiency is an ongoing public health issue.

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