

Vitamin D Related Genes And Childhood Asthma And Lung Function

N. E. Lange¹, **S. Rifas-Shiman**², **D. R. Gold**³, **M. Gillman**², **A. A. Litonjua**³,

¹Harvard Medical School, Boston, MA, ²Harvard Pilgrim Health Care Institute, Boston, MA, ³Brigham and Women's Hospital, Boston

Corresponding author's email: nlange@partners.org

Rationale: Several studies have found associations between vitamin D and either asthma or lung function. We hypothesized that single nucleotide polymorphisms (SNPs) in vitamin D-related genes would be associated with asthma and lung function in children at age 7.

Methods: Project Viva is a longitudinal birth cohort of mother-child pairs in the greater Boston, MA area who have been followed

longitudinally since their 1st trimester of pregnancy up until the child is age 7. Mothers were asked questions about their child's health at regular intervals. Spirometry was performed on children at their 7 year visit. Asthma was defined as ever having physician-diagnosed asthma in addition to the use of asthma medication within the last 12 months. DNA was extracted from stored blood samples from the children. 1055 tagging SNPs from 55 vitamin D-related genes were selected from the literature for genotyping based on their association with vitamin D levels, vitamin D metabolism, or vitamin D and immune function. Genotyping quality was high with a 97.7% average passing call rate and 100% passing concordancy rate. Chi-squared tests and linear regression were used for statistical analysis in PLINK.

Results: Of the 614 children included in the study, 84 (14%) had a diagnosis of asthma using the above definition. 520 of the 614 children completed spirometry. All were of Caucasian race. Preliminary analysis revealed several of the top 10 SNPs associated with asthma diagnosis were in the following genes CYP27A1 (enzyme that converts vitamin D to 25(OH)D, the most commonly measured serum metabolite), IL-4 (a T_H2 cytokine) and VDR (the vitamin D receptor, p=.002 to .006). Several of the top 10 SNPs associated with lung function (FEV₁ or FVC) were in KL (klotho gene, associated with premature aging and high 1,25(OH)₂D₃ levels in knockout mice), IL4 and

VDR (p=8 x10⁻⁶ to 0.001)

Conclusions: Several SNPs in genes associated with vitamin D metabolism, vitamin D levels, or vitamin D and immune function were related to asthma and lung function in children at age 7 in this cohort. Further analyses will investigate interactions with vitamin D levels and these SNPs as well as other asthma-related phenotypes.

This abstract is funded by: NIH R01 HL064925

Am J Respir Crit Care Med 185;2012:A5605

Internet address: www.atsjournals.org

Online Abstracts Issue