

STRONG CHILDREN'S RESEARCH CENTER

Summer 2017 Research Scholar

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Background: According to the World Allergy Organization the industrialized (developed) world has continuously risen

1. The "Hygiene Hypothesis" attempts to explain this rise by associating increased allergic disease prevalence with misdirected immune system caused by a lack of microbial exposure in newborns and infants. Our lab's recent and continuing study aims to compare immune system development within infants from two communities: Old Order Mennonites of the Penn Yan, NY area (OOM) and the residents of urban/suburban Rochester, NY (ROC). When compared to the general population, OOM seldom report being affected by allergic conditions such as asthma, hay fever, and food allergy thus, they can be labelled as low risk for allergic disease². This low risk is thought to be attributed to the farm -life lifestyle, which exposes them to a large amount and diversity of microbes. Therefore, we hypothesize that the diet, lifestyle, and microbial exposure of OOM newborns and infants lead to the development of a much more robust immune system than the Rochester general population.

Objective: This project aims to compare 1) the diversity of IgA coated microbiome and 2) the initial appearance of IgA coated bacteria OTUs in stool samples of infants from populations of both the OOM and Rochester communities.

Methods: Collection of ROC (n=4) and OOM (n=4) samples occurred at two time points/visits post-delivery: between 0-1 month and between 4-12 months. We then used IgA-SEQ (flow-cytometry-based bacterial cell sorting followed by 16S rRNA sequencing) in order to identify and categorize distinct bacteria OTUs. Data were analyzed using the QIIME package.

Results: Our pilot data show that 1) alpha diversity of total microbiome significantly increases in both ROC and OOM infants; 2) diversity of IgA non-coated bacteria in ROC outpaces OOM; 3) diversity of IgA coated bacteria is higher in OOM and outpaces ROC. LESe analysis showed that specific IgA+ bacteria OTUs colonize in OOM more quickly than in ROC. Additionally, i

References:

1. Pawankar R, Canonica GW, Holgate ST, Lockey RF. White Book on Allergy 2011-2012 Executive Summary. World Health Organization .
2. Martina, C.; Looney, R.; Marcus, C.; Allen, M.; Stalhlut, R. "Old Order Mennonites in New York Have Low Prevalence of Allergic Disease". *Annals of Allergy, Asthma, & Immunology*. 2016; 117, 562-63.