ROLE OF THE GUT MICROBIOTA IN AUTISM SPECTRUM DISORDERS AND INFLAMMATORY BOWEL DISEASES.

UREP21-059-1-011

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GOALS AND OBJECTIVES

PILOT STUDY

1. Running an **awareness campaign** among healthcare professionals, scientists and public on the role of gut microbes in health and diseases.
   - Assessing awareness
   - Assessing readiness
   - Raising awareness

2. **Optimizing** protocols, extractions, study designs, sample sizes, recruitment methods, IRB documents.

3. **Profiling** the gut microbial **taxonomic composition** in a cohort of 55 volunteers with neuropsychiatric disorders (ASD/ADHD), gastrointestinal disorders (IBD/IBS) or healthy individuals (controls): **Bacteria AND Fungi**.

4. **Identifying associations** between **microbial diversity shifts**, microbial ratio, specific taxonomic groups abundance and any of the three groups.

   **Identifying associations** between **lifestyle** habits/history and any of the three groups.
ACHIEVEMENTS AND OUTCOMES

1. **Obtained** important **preliminary data** on **readiness** of the population to participate in clinical trials involving intensive dietary interventions to modulate the gut microbiota and readiness of healthcare professionals/scientists to support such interventions.

2. **Obtained** important preliminary data assessing **lifestyle** and medical history of individuals with ASD/ADHD or IBD/IBS.

3. **Optimize** DNA extraction from stool samples and sequencing techniques.

4. **Identified** 25 bacterial OTUs and 1402 fungal OTUs that are unique to the ASD/ADHD group.

5. **Identified** 29 bacterial OTUs and 1638 fungal OTUs that are unique to the IBD/IBS group.

6. **Identified** numerous taxonomic groups of bacterial and fungal relative abundance and taxonomic ratios significantly associated (p >0.05) with either the ASD/ADHD group or the IBD/IBS group.

7. **Confirmed** the **decreased biodiversity** shift in the ASD/ADHD group as well in the IBD/IBS group observed in the literature in other countries.

8. **Ran successful awareness campaign**: seminars, publications.
ACHIEVEMENTS AND OUTCOMES

Figure 1: OTU-Venn diagram - after bacterial 16sRNA Sequencing

Figure 2: OTU-Venn diagram - after fungal ITS Sequencing

Figure 3: Observed species - alpha diversity

Figure 4: Examples of association of bacterial and fungi families with the ASD/ADHD group.
The role of gut microbiota in atopic asthma and allergy, implications in the understanding of disease pathogenesis

Mohammad Salameh, Zaia Bursey, Nada Mhaimed, Ibrahim Laswi, Noha A. Yousif, Ghizlane Bensarris, Dalia Zakaria

Abstract

Asthma is a clinical syndrome characterized by chronic airway inflammation. There is mounting evidence on the role of microbiota in the development of asthma. This review focuses on the role of microbiota in maintaining the integrity of the epithelial and their role in regulating the immune response. The review compiles data from multiple studies on the role of microbiota in the innate immune response and the development and differentiation of CD4+ T cells, a major component of the adaptive arm of the immune response. As a result of dysbiosis, invariant natural killer T (iNKT) cells may induce T helper 2 cell differentiation and immunosuppressive T cell responses through the release of interleukins 4 and 10. Furthermore, degradation of immunoglobulin A antibodies, increased circulating mast cells and basophils, and inflammation are among other mechanisms by which dysbiosis can induce or exacerbate asthma. After explaining the underlying mechanisms, the review draws conclusions from studies that investigated dysbiosis in infancy and the development of asthma later in life. The review also includes studies that investigated gut microbiota and the development of asthma in children and the role of dysbiosis in that regard. Finally, the review explains the statistical relationship between asthma and allergy through multiple studies that investigate the role of dysbiosis in both atopic states. This review provides insights into the role of dysbiosis in asthma, and an understanding that is required to establish clinical trials which aim to modulate the gut microbiota as a means of preventing and treating asthma.
POST PROJECT PLANS

Probiotic content of dairy products in Qatar.

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EEG-based exploration of the variables affecting response to Music Medicine.

Lifestyle Medicine Intervention on a local cohort of Autistic Children:
- Diet
- Probiotics
- Music

Readiness for Diet Intervention? Yes = 1; No = 0

67.75%

6.04%