



The College of Graduate Studies and the College of Medicine and Health Sciences Cordially Invite You to a

Master Thesis Defense

Entitled

CORRELATION OF GUT ALTERATION WITH THE PROGRESSION OF EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS (EAE) IN C57BL/6 MICE

by

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Date & Venue

1:00 pm

Wednesday, 12th of October 2022

Fatima Theatre

Link for Online

[Click here to join the meeting](#)

Abstract:

Background: Experimental autoimmune encephalomyelitis (EAE) is the mouse model of multiple sclerosis (MS), a chronic autoimmune disease targeting the central nervous system (CNS) resulting in neuroinflammation, neuroaxonal degeneration, and demyelination. Autoreactive CD4⁺ T cells are known for their role in the pathogenesis of MS. CD8⁺ T cells and NK cells were also found to be associated with the disease.

Aim: It is surprising the fact that there is a lack of studies investigating the link between gut alterations and immune cells influencing the outcome of the disease since the vast majority of MS patients experience gastrointestinal (GI) problems. Here, we correlate alterations in gut microbiota with disease progression along with changes in lymphocytes counts over different time points during the course of the disease.

Method: In the current study, EAE was induced in female C57BL/6 mice with MOG³⁵⁻⁵⁵ peptide emulsified in the incomplete Freund's adjuvant supplemented with *Mycobacterium Tuberculosis* H37Ra. Flow cytometry was used to assess the level of CD4⁺, CD8⁺ T cells, NK cells, and their activation status within the intraepithelial lymphocyte (IELs) throughout the disease progression. This was done along with qPCR analysis to determine the fold change of the selected bacterial species that were previously reported to be altered in MS patients; *Lactobacillus reuteri*, *Prevotella copri*, *Bacteroides fragilis*, *Clostridium perfringens*, and *Akkermansia muciniphila*. In addition, counts of Paneth cells whose role is essential in maintaining the balance of the normal flora were also investigated by histochemistry.

Results & conclusion: Our results showed no change in the frequencies of both gut CD4⁺ and CD8⁺ T cells at all time points, along with an increase in the percentage and activation of gut NK cells at the peak of the disease, a decrease in the beneficial gut normal flora (*Lactobacillus reuteri* & *Prevotella copri*), and significant Paneth cells hyperplasia. Altogether, indicate that interactions between gut flora and NK cells may contribute to the pathogenicity of MS.

Keywords: Experimental autoimmune encephalomyelitis, Multiple sclerosis, Gut microbiota, NK cells activity, Cell frequency, Gut/Brain interaction.