Dissertation Defense Announcement
To: The George Mason University Community

Candidate: Salvia Misaghian

Program: PhD in Bioinformatics & Computational Biology

Date: Friday, December 8, 2023

Time: 10:00 AM EST

Join Zoom Meeting:

https://gmu.zoom.us/j/95270272487?pwd=a2xSNXZqWDJMWThNd3A0VFkvUVRBZz09

Committee chair: Dr. M. Saleet Jafri
Committee co-chair: Dr. Iosif Vaisman
Committee member: Dr. Aman Ullah

Title: “Inflammatory Signaling Pathways in Ulcerative Colitis”

All are invited to attend the defense

ABSTRACT:

Inflammatory bowel disease (IBD), including both Crohn's disease (CD) and ulcerative colitis (UC), is a complex condition that is characterized by immune system abnormalities as its fundamental cause. Despite the exact origin of these disorders remaining unknown, it is clear that many factors containing immunological, genetic, environmental, and microbial elements play a role in the pathogenesis of IBD by affecting the regulation of mucosal immunity and the integrity of the intestinal mucosal barrier. Traditional diagnostic and treatment approaches for IBD require invasive tests and procedures that can be both discomforting and risky to patients. To overcome these diagnostic challenges, the search for non-invasive biomarkers aims to replace these uncomfortable procedures.
In this research, we have three core objectives, seeking to illustrate molecular basis underlying of IBD that can ultimately lead to enhance diagnostic capabilities and personalized strategies for treatment.
Aim 1 Focuses on identifying UC biomarkers and genetic factors. Bioinformatics analysis identifies differentially expressed genes (DEGs) linked to UC and confirms their significance. This exploration paves the way for potential diagnostic markers and sheds light on UC's

genetic foundations.
Aim 2 distinguishes CD from UC by scrutinizing unique characteristics and mechanisms. Using a GEO dataset, genes significantly altered in UC patients, yet not in CD, are revealed, offering potential diagnostic insights. Tissue-specific gene expression patterns are also examined to pinpoint distinguishing markers. Pathway analysis unveils underlying molecular pathways, enhancing our understanding of CD and UC differences.
Aim 3 delves into the role of T-cell inflammatory responses in IBD. The analysis identifies genes associated with T-cell function and their significance in UC. It unearths immune dysregulation, reaffirms the role of inflammatory responses in IBD, and highlights relevant pathways.
In summary, this research navigates the complex landscape of IBD, from identifying biomarkers and genetic factors in UC to distinguishing CD from UC and exploring the essential role of T-cell responses in IBD. These findings offer potential diagnostic and treatment opportunities in IBD management.