



Public Health  
Agency of Canada

Agence de la santé  
publique du Canada



University  
of Manitoba



# **High Level of Short-chain Fatty Acids Has Direct Effects on the Barrier Function of Cervicovaginal Epithelial Cells**

**Abu Bakar Siddik, PhD candidate**

**Supervisors: Ruey Su & Blake Ball**

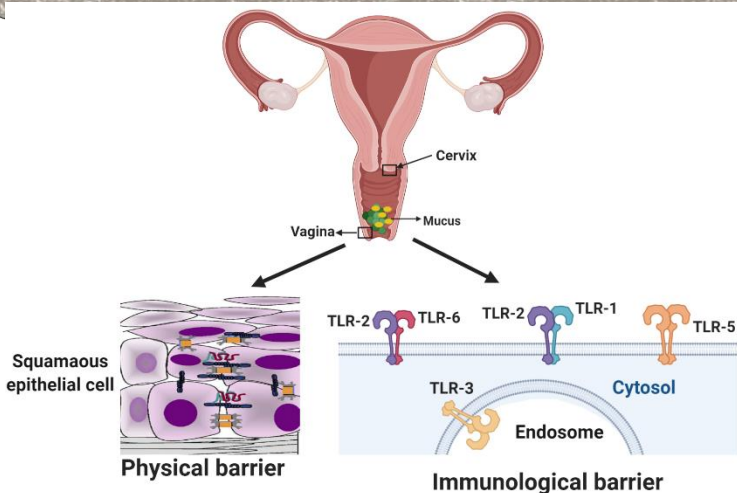
**Medical Microbiology & Infectious Diseases,**

**University of Manitoba, Canada**

**E-mail: [siddikab@myumanitoba.ca](mailto:siddikab@myumanitoba.ca)**

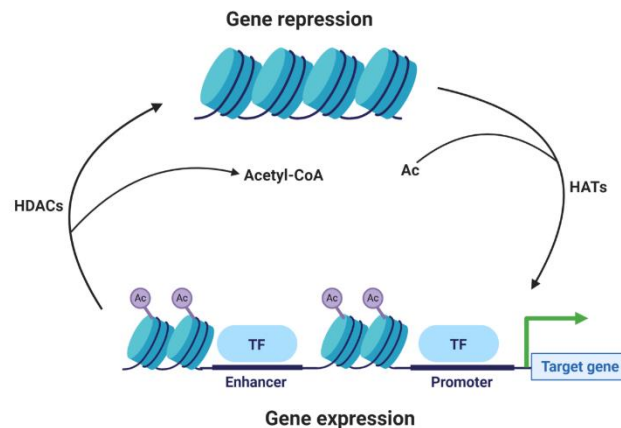
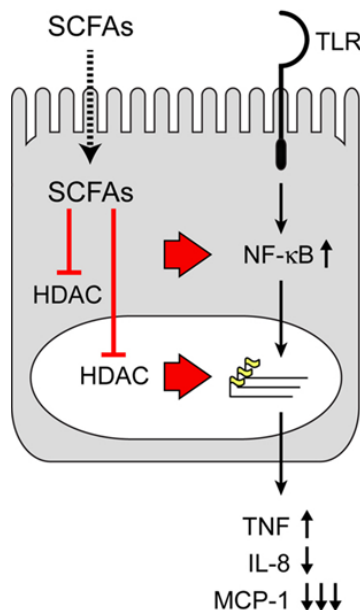


# Barrier Functions of Cervico-vaginal Epithelial (CVE) Cells & SCFAs level in the Cervico-vaginal Mucosa and SCFAs effect on the CVE cells



	Healthy	Dysbiosis
Propionate	<1 mM	Propionate 2-4 mM
Butyrate	<1 mM	Butyrate 2-4 mM
Acetate	0-4 mM	Acetate ~120 mM

Higher level of SCFAs (acetate, propionate and butyrate) are associated with vaginal microbial dysbiosis



## GAP in Knowledge

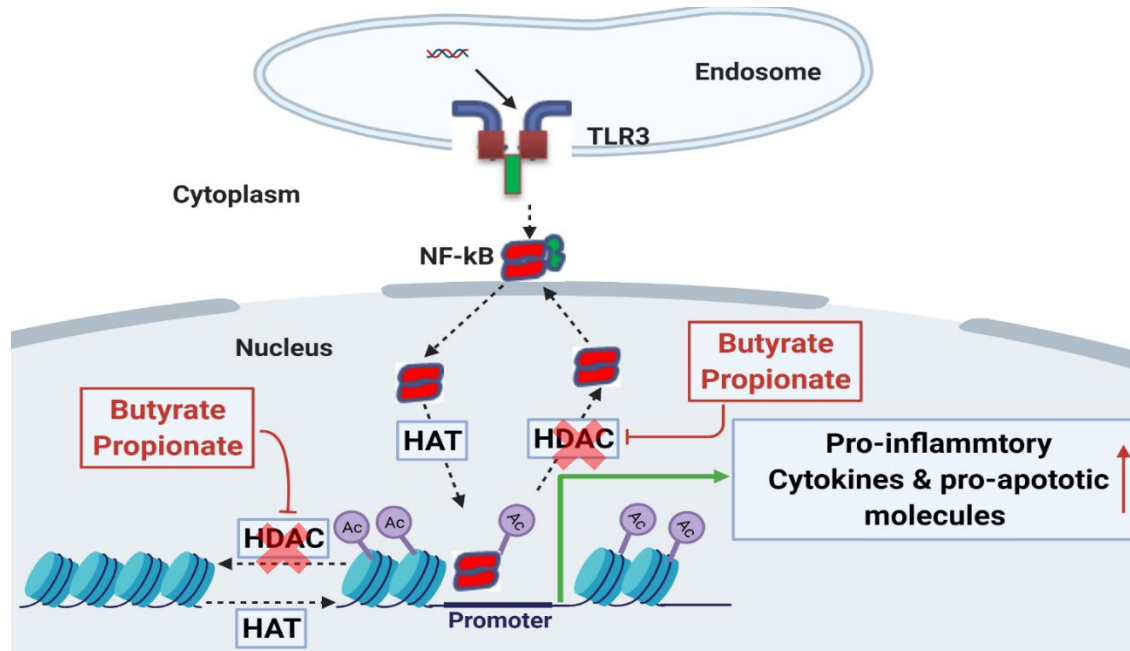
- ❑ SCFAs in altering CVE integrity
- ❑ SCFAs in modulating CVE gene expression
- ❑ SCFAs in increasing diseases susceptibility by damaging CVE integrity

# Hypothesis

High levels of butyrate and propionate impairs epithelial barrier integrity by augmenting immune activation, resulting in increases the expression of pro-inflammatory mediator genes and pro-apoptotic gene.

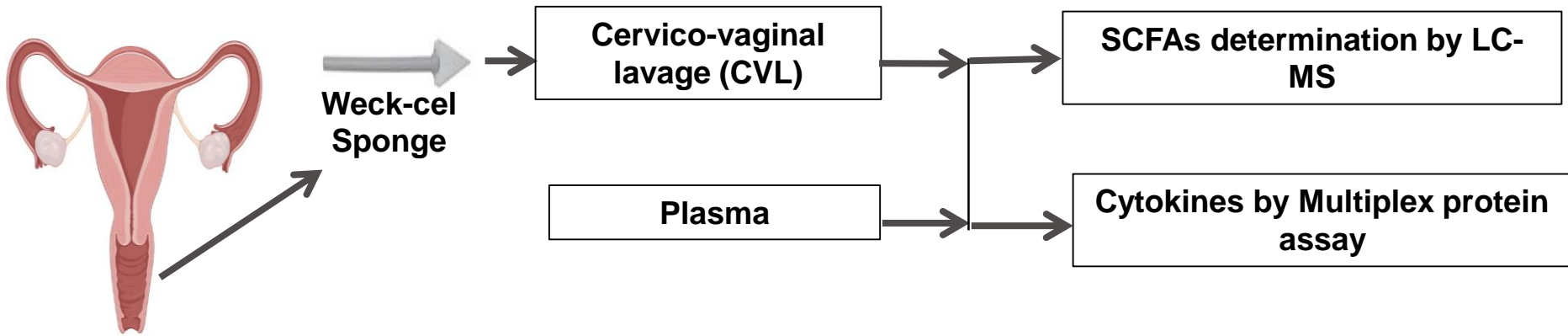
# Objectives

1. To evaluate the relationship between the level of SCFAs and pro-inflammatory cytokine/chemokine in cervico-vaginal fluids
2. To determine the effects of butyrate/ propionate on para-cellular permeability

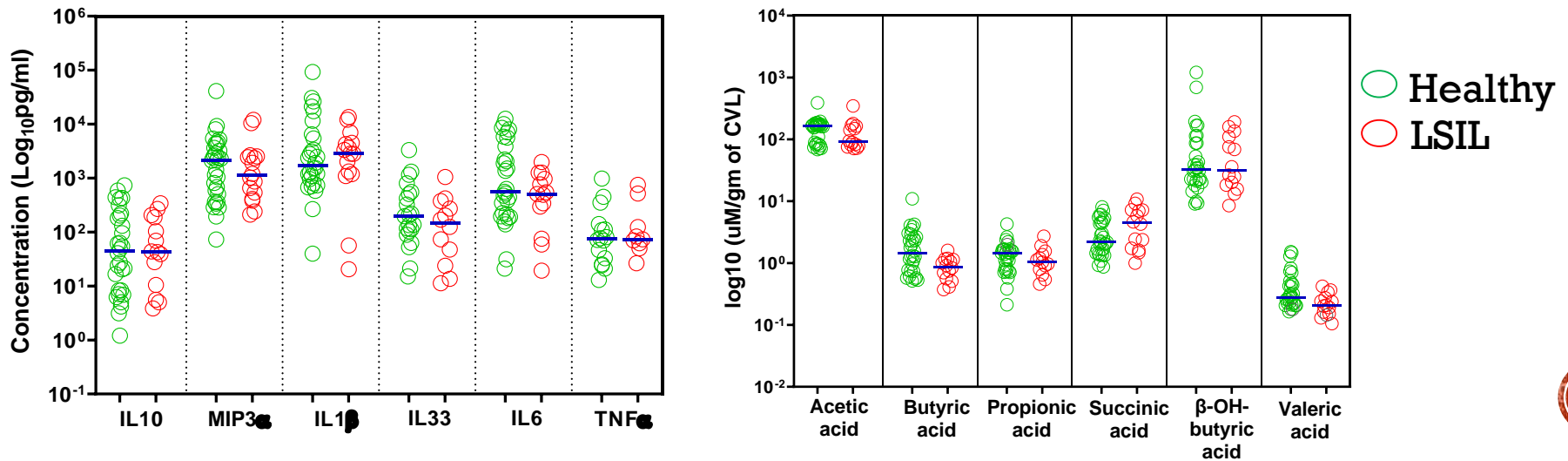


# Obj.-1: The Association of Vaginal SCFAs Metabolites with Vaginal Cytokines.

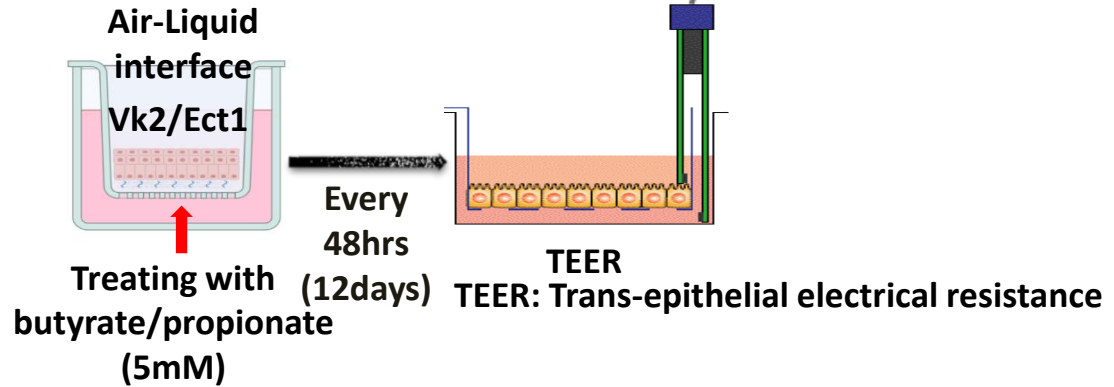
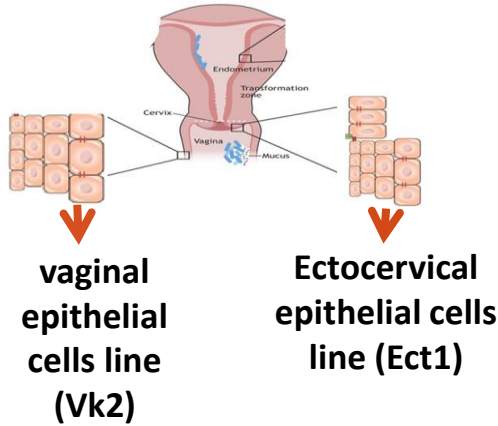
- ❑ Cross sectional study
- ❑ Healthy control cohort
- ❑ Women Contain Low grade Squamous intraepithelial lesion (LSIL)



LSIL patients have Similar level of Pro-inflammatory Cytokines & SCFAs Compare to Healthy Control

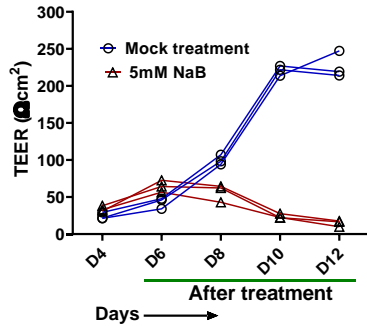


# Objective-2: SCFAs Effect on Increasing the Para-cellular Permeability

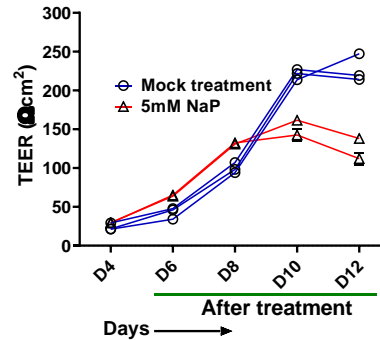


**Ect1**

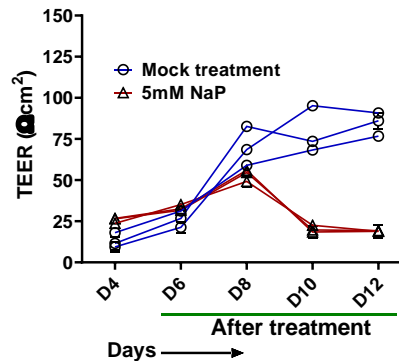
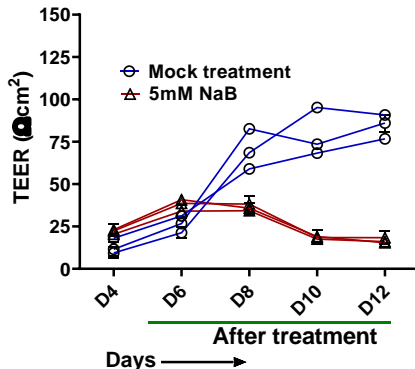
**Butyrate**



**Propionate**



**Vk2**



Epithelial Integrity of Ect1 & Vk2 were Decreased by Butyrate & Propionate treatment

**Overall Summary of both Objectives:**

- Under non-inflammatory condition, there is no correlation between the vaginal SCFAs level and cytokine levels.
- Butyrate & propionate treatment impaired the epithelial integrity of Ectocervical and Vaginal epithelial cells.