THE UNIVERSITY OF BRITISH COLUMBIA

BC Children's Hospital Research Institute

Gut4Health Microbiome Core Facility

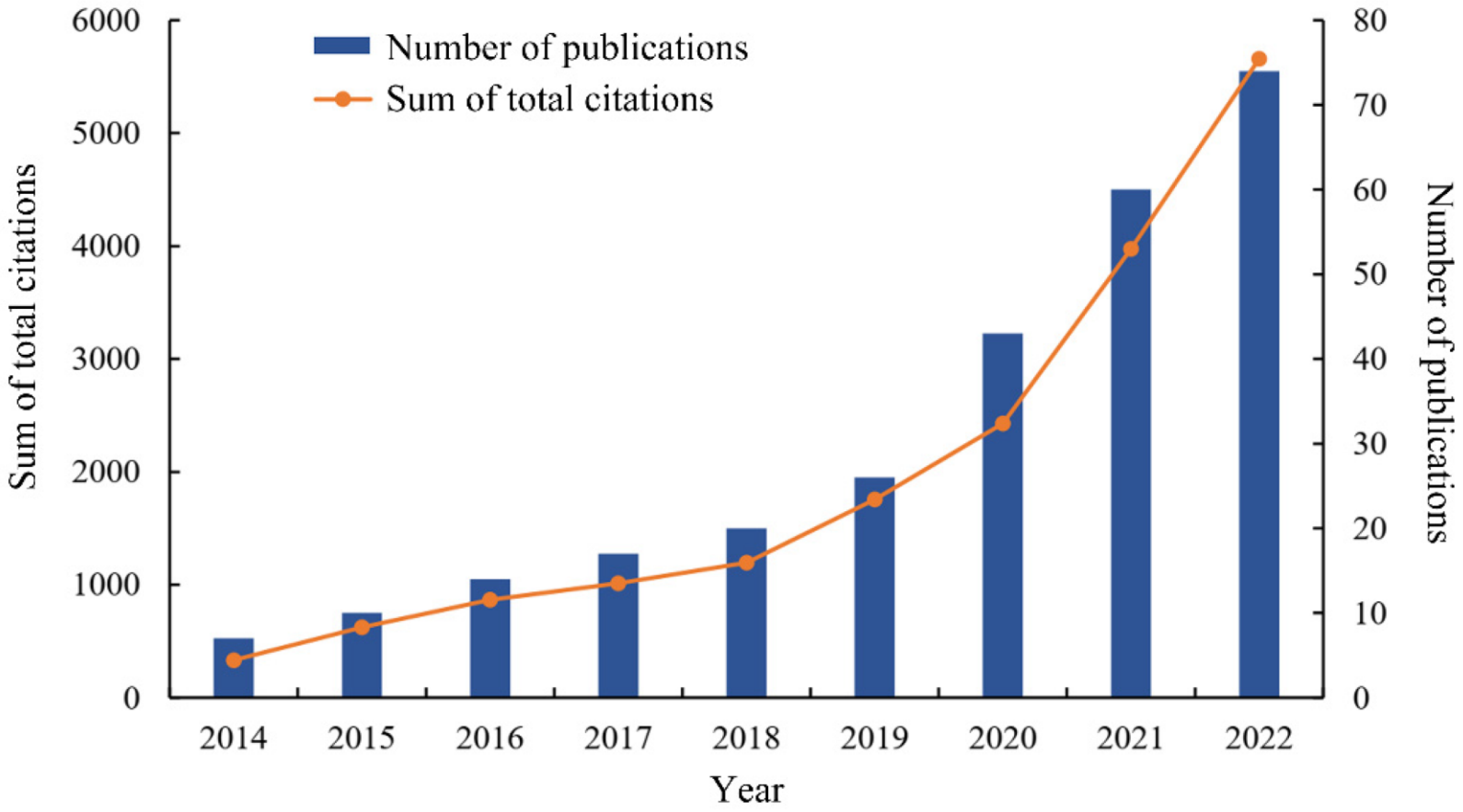
Larissa Celiberto, PhD

Postdoctoral Research Fellow | Clinical Research Coordinator

Vallance Lab | Gut4Health

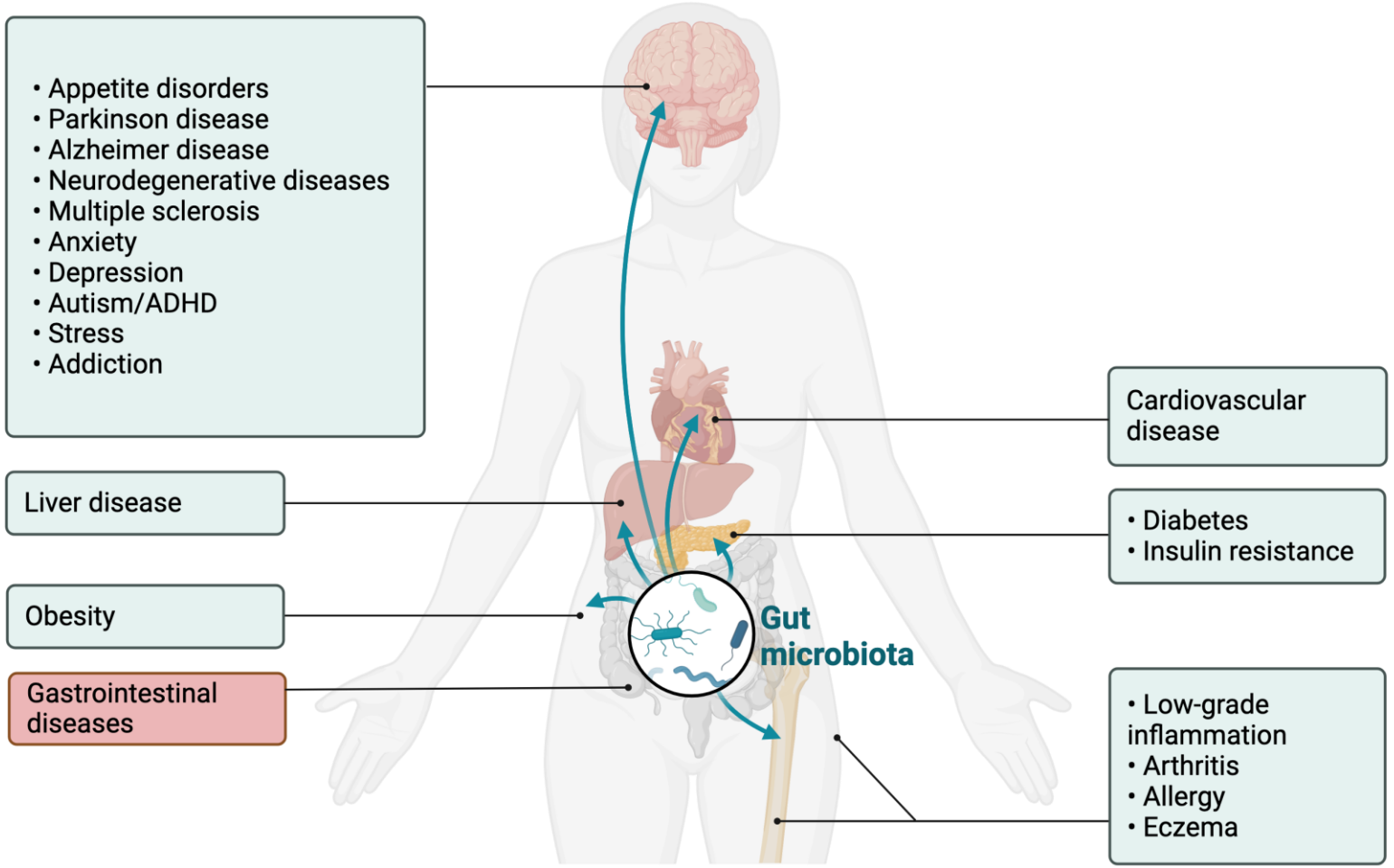
October 18th, 2023

Microbiome research over the years



Zhai J. et al. *Microorganisms* **11**, 2125 (2023).

Microbiome Impact on Host Health



Created with BioRender.com

MINING FOR MIRACLES

BC Children's Hospital Foundation

Dr. Bruce Vallance

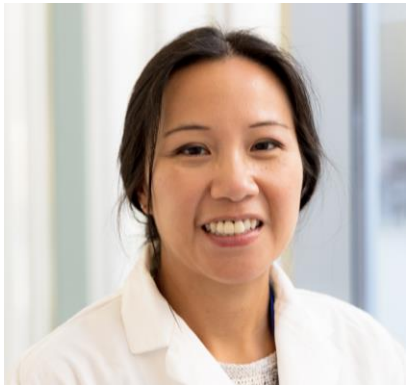
2018: Gut4Health Proposal

2019: $3.7 million raised to establish the Gut4Health Microbiome Core Facility at BCCHR

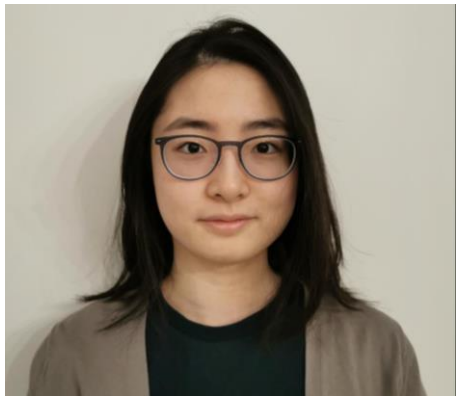
Our team

Dr. Bruce Vallance
Director

Dr. Andy Sham
Project Manager



Dr. Catherine Chan
Research Technician



Bernice Wong
Research Technician

Dr. Larissa Celiberto
Research Coordinator

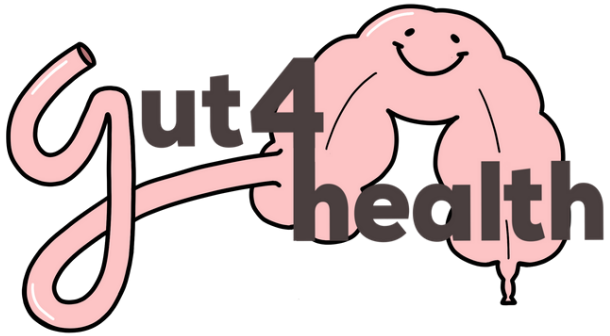
Maira Jiménez Sánchez

Irvin Ng

Microbiome analysis support

Gut4Health goals

- Facilitate microbiome studies for researchers in BC
- Assist researchers who are not primarily focused on the microbiome field
- Connect basic science researchers with clinicians to bridge the gaps between these two fields
- Work with the pharmaceutical industry to develop new diagnostic tools and novel therapeutics



How can we help?

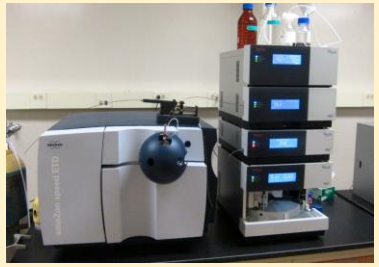
- Consultation and study design
- Ethics and grant applications
- Sample preparation (collection/storage/processing)
- Quality control tests
- Storage of clinical specimens
- Nucleic acid isolation and quantification
- Next generation sequencing (16S, shotgun, 18S, ITS)
- Target microbiome enumeration (ddPCR)
- Anaerobic culturing
- Data analyses and bioinformatics

We are here to support you from study design to publication!

Extra → Research experiments

Additional services

- Integration with other BCCHR Core facilities



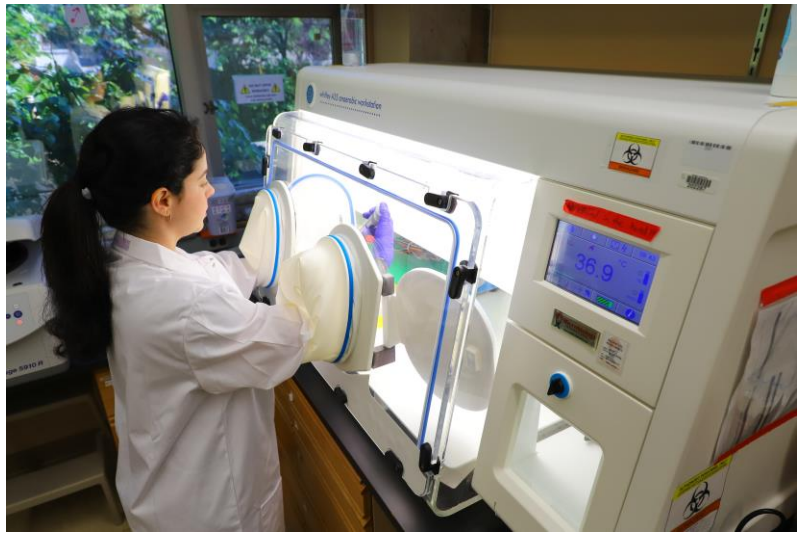
Metabolomics
(AcMan)

Animal Facility

Histology

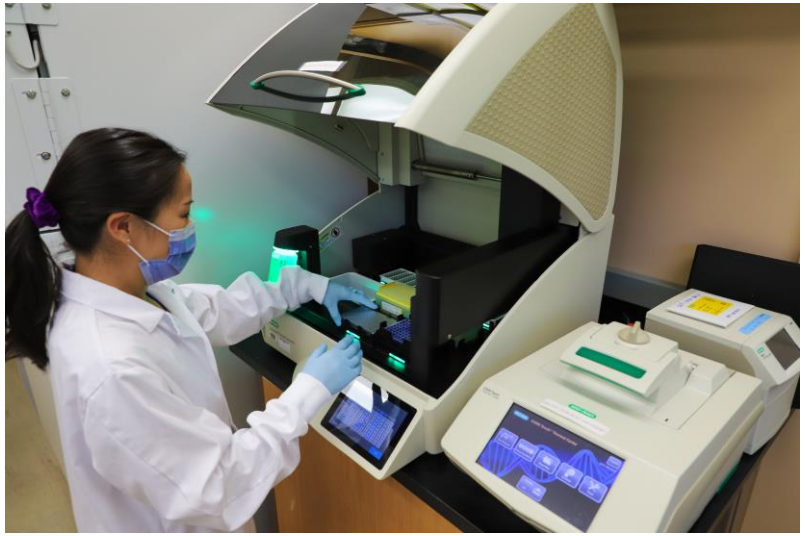
Training

Self-service instrument usage



A35 Don Whitley Anaerobic chamber

Thermo Scientific™ KingFisher™ System



BioRad QX200 automated droplet digital PCR

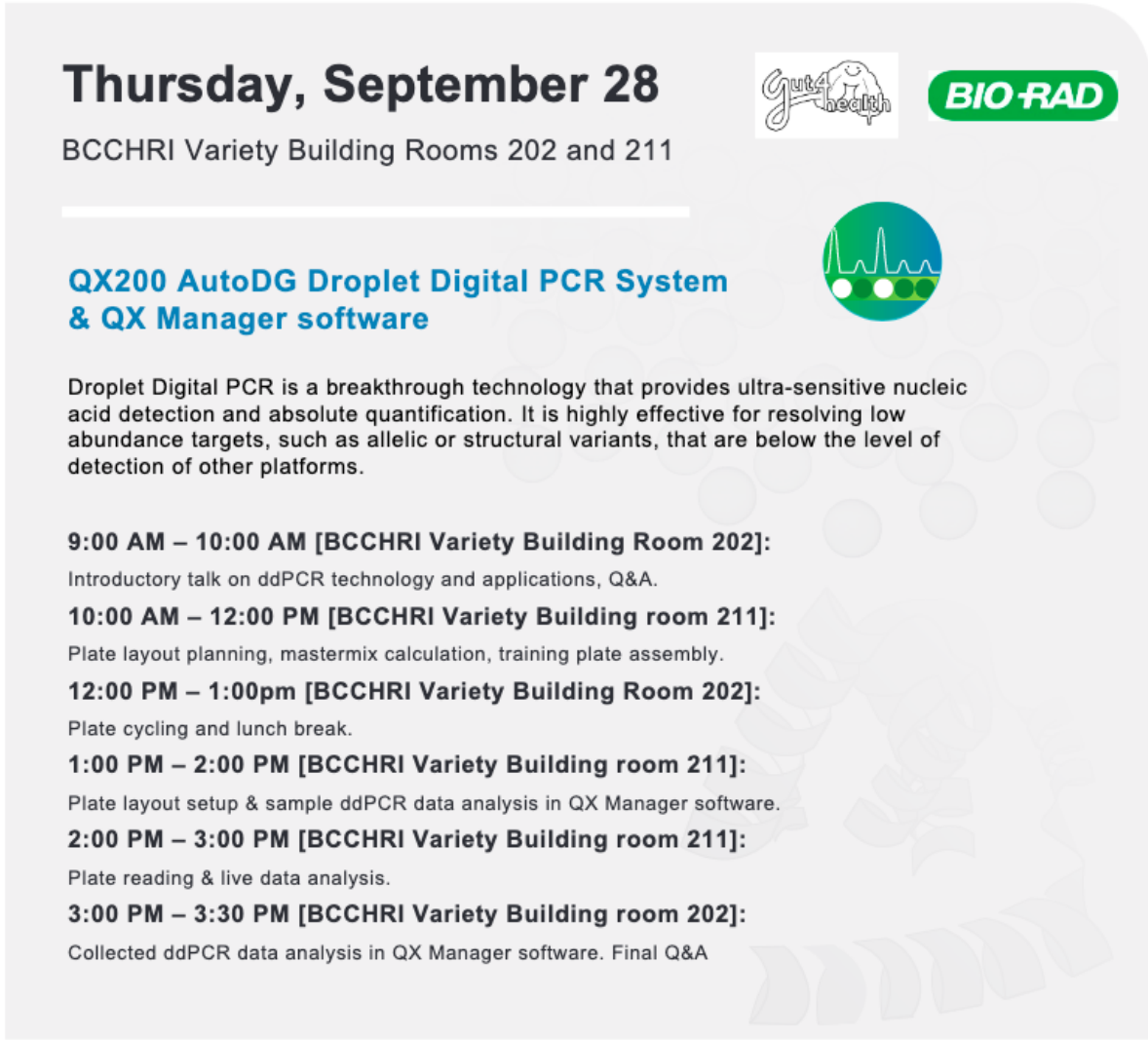
Training

Specific training sessions in collaboration with Bio-Rad – ddPCR System

- Opportunity to learn the technique and also test a few of your samples

- 4x/year

Contact us if you are interested!
gut4health@bcchr.ca

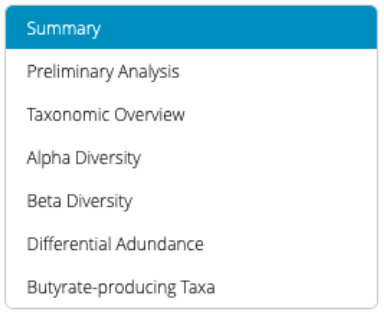


Lunch will be provided with your RSVP

Projects

2020-2023 → Gut4Health has supported over 20 research groups (academia and industry)

16S rRNA sequencing



16S Analysis - Vallance_Larissa_Muc2

Alana Schick, Gut4Health

2021-02-25

BC Children's Hospital — An agency of the Provincial Health Services Authority

Gut4Health

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Vancouver, B.C. V5Z 4H4
t 604.875.2000. ext 5168 f 604.875.2496
www.bcchr.ca/gut4health

Report prepared by	Report reviewed by
Dr. Alana Schick	Dr. Ho Pan Sham
Computational Biologist-Gut4Health	Project Manager-Gut4Health
25 February, 2021	25 February, 2021

Summary

The aim of this work is to investigate differences in the microbiome composition in mice lacking mucus completely (Muc2 KO) or partially (Core1 KO).

Overview of Findings

Microbial communities were profiled using sequence data from the V3-V4 region of the 16S rRNA amplicon. Following quality control and filtering of sequence data, taxonomic compositions of each sample were determined using a custom pipeline implementing the dada2 R package.

This report contains an analysis of these samples and is presented in the following sections:

→

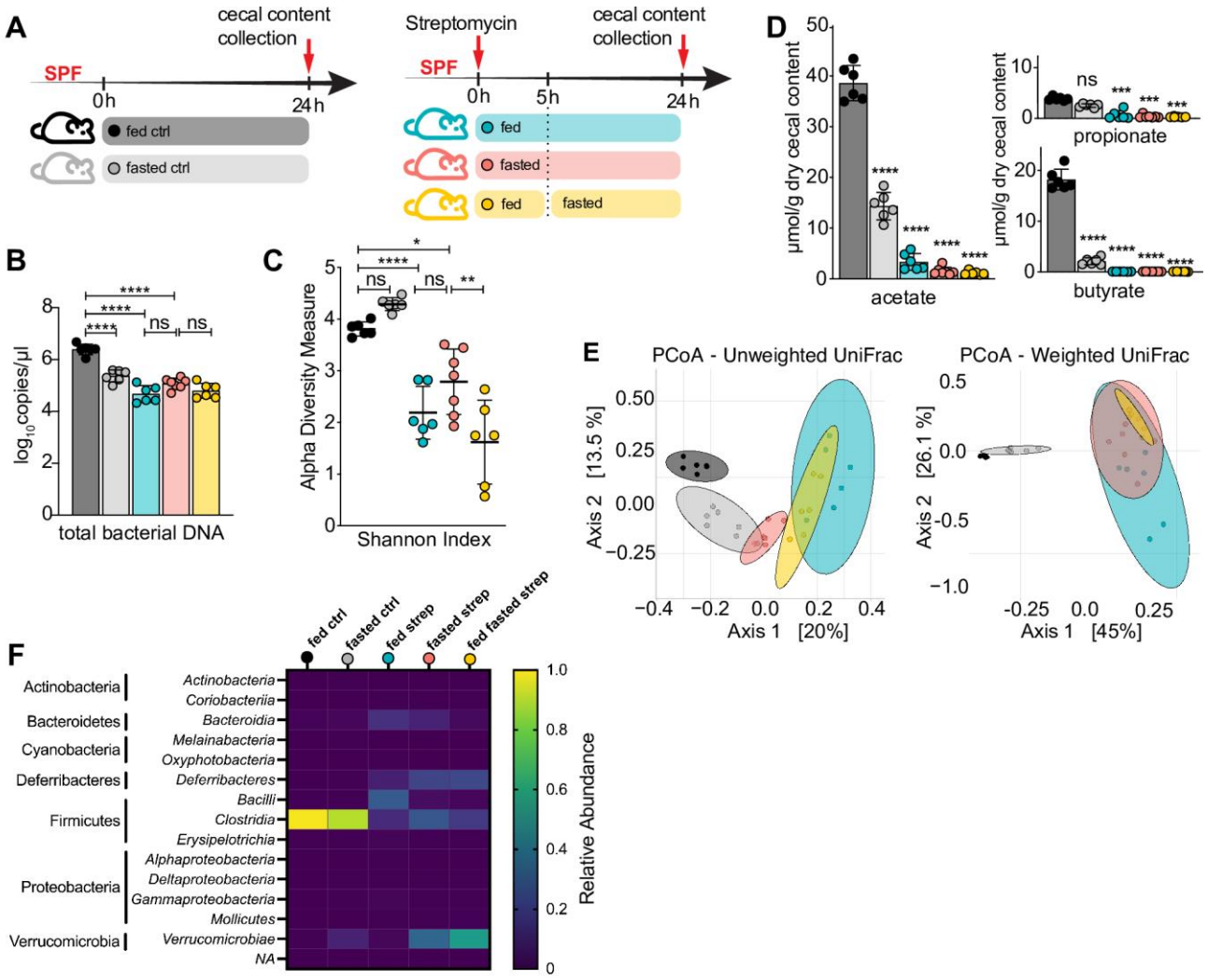
- Data report
- Individual files
- Raw data

Publications

> PLoS Pathog. 2021 Aug 5;17(8):e1009719. doi: 10.1371/journal.ppat.1009719. eCollection 2021 Aug.

Fasting increases microbiome-based colonization resistance and reduces host inflammatory responses during an enteric bacterial infection

Franziska A Graef [1], Larissa S Celiberto [1], Joannie M Allaire [1], Mimi T Y Kuan [1], Else S Bosman [1], Shauna M Crowley [1], Hyungjun Yang [1], Justin H Chan [1], Martin Stahl [1], Hongbing Yu [1], Candice Quin [2], Deanna L Gibson [2], Elena F Verdu [3], Kevan Jacobson [1], Bruce A Vallance [1]



Services:
- ddPCR for total bacteria
- 16S rRNA sequencing
- Short chain fatty acids (SCFA)

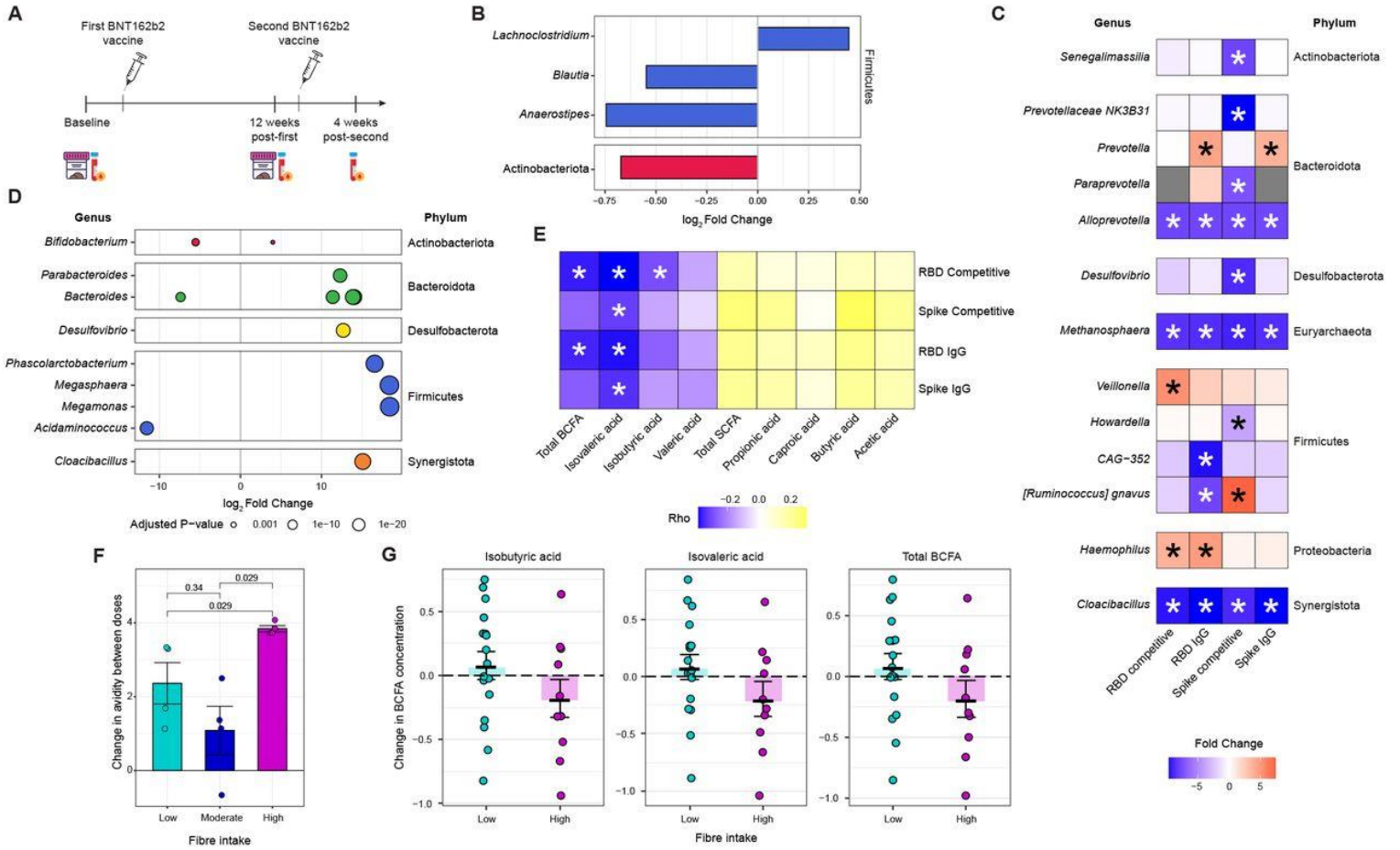
Publications

> Gut. 2022 Dec 22:gutjnl-2022-328556. doi: 10.1136/gutjnl-2022-328556. Online ahead of print.

Gut microbiome and dietary fibre intake strongly associate with IgG function and maturation following SARS-CoV-2 mRNA vaccination

Genelle Rose Lunken [1 2], Liam Golding [2 3], Alana Schick [4], Abdelilah Majdoubi [2], Pascal M Lavoie [2], Bruce Andrew Vallance [5 2 4]

Services:
- 16S rRNA sequencing
- SCFA



Ongoing clinical studies

Oral Probiotics in Pregnancy to Reduce Group B *Streptococcus* Colonization

OPSiP Study

Services:
- Sample processing
- Primer design
- ddPCR optimization
(vaginal swabs and stool samples)

Therapeutic efficacy of a novel whole food exclusive enteral nutrition diet in pediatric Crohn's disease

- Study design
- REB submission
- 16S rRNA sequencing
- SCFA
- Ex-vivo assay under anaerobic conditions

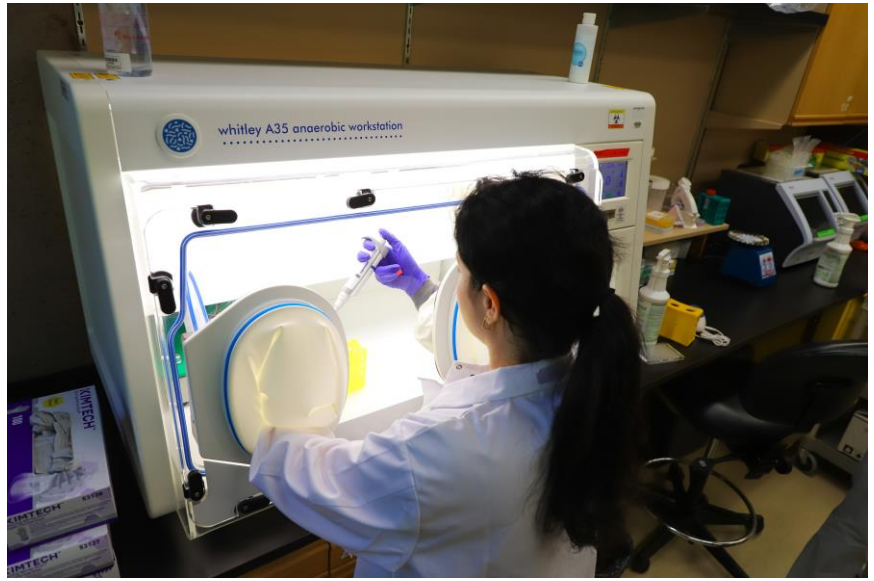
Ongoing clinical studies

Precision medicine approach to test prebiotics in Short Bowel Syndrome

GutSim: a culture- and metabolomics-based assay to investigate individual microbiome responses to interventions

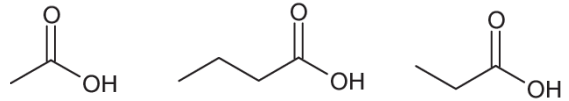
Intervention

Bacterial Fermentation



Microbiome + Metabolomics

16S + SCFA



Acetate **Butyrate** **Propionate**

Services:
- Study design
- Grant application
- GutSim assay
- 16S rRNA sequencing
- SCFA

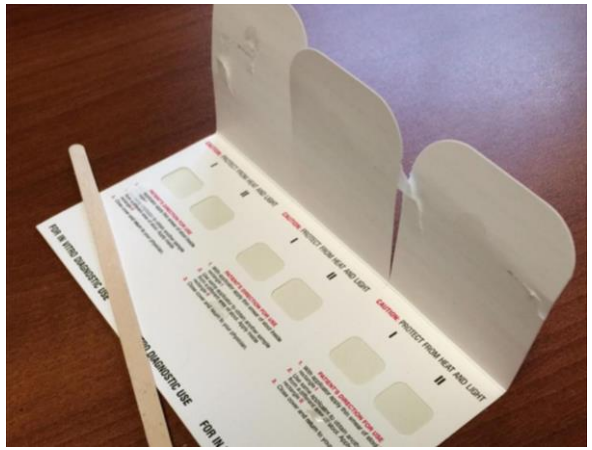
Ongoing clinical studies

Compound anti-microbial activity against skin commensal Gram positive bacteria

Pan-Biome Pharmaceuticals Inc.

Services:
- In vitro growth assay
- Animal model experiment
- 16S rRNA sequencing

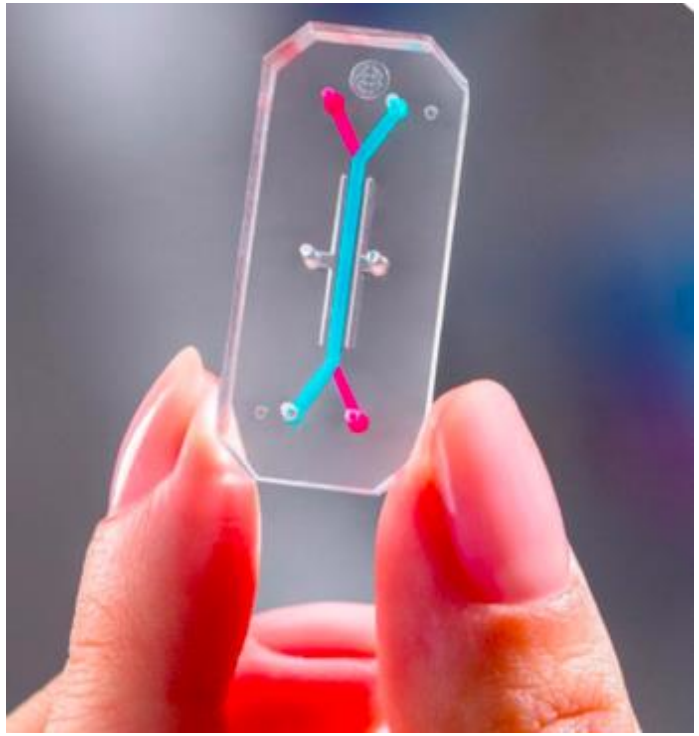
DNA extraction optimization using Fecal Occult Blood card samples

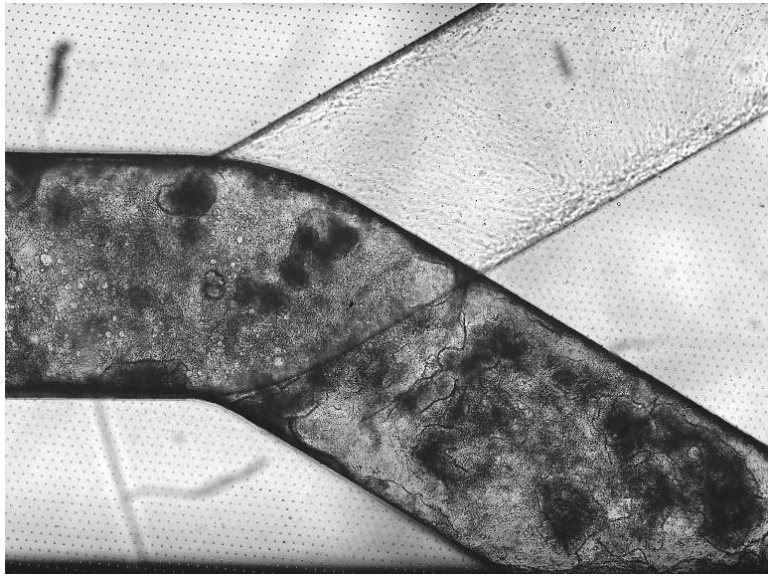


Services:
- Sample prep optimization
- Shotgun sequencing

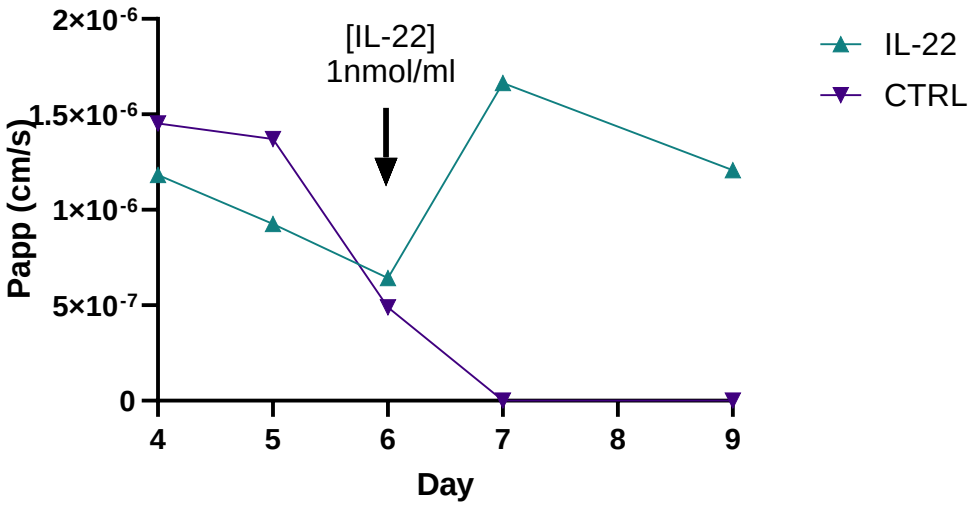
Future projects

Gut-on-a-chip system





Microfluidic chip cultured with primary IECs



Barrier permeability after 6 days of culture.

Thank you!

Contact us:

Email: gut4health@bcchr.ca
Phone: 604-875-2000 ext. 5773
Rm 211 – 2nd floor Variety building

www.bcchr.ca/gut4health

Service fees:

Service	Unit	BCCHR	UBC	Academics	Industry
DNA extraction	Each	$ 15.00	$16.00	$18.00	$20.00
SCFA	Each	$ 60.00	$60.00	$60.00	$100.00
Vitamin D	Each	$ 30.00	$30.00	$50.00	$60.00
Negative ion HILIC	Each	$ 55.00	$55.00	$55.00	$71.50
Bile Acid Analysis	Each	$ 45.00	$45.00	$45.00	$90.00
16S library with sequencing (no bioinformatics)					
<100 samples	Each	$40.00	$40.00	$40.00	
>100 samples	Each	$35.00	$35.00	$35.00	
>200 samples	Each	$30.00	$30.00	$30.00	
16S library with sequencing (with bioinformatics)					
<100 samples	Each	$70.00	$70.00	$75.00	$120.00
>100 samples	Each	$65.00	$65.00	$70.00	$110.00
>200 samples	Each	$55.00	$55.00	$75.00	$100.00
Bioinformatics service	Hour	$ 70.00	$80.00	$80.00	$120.00