



**COLLEGE of
BIOLOGICAL SCIENCE**

DEPARTMENT OF MOLECULAR
AND CELLULAR BIOLOGY

Announcement:

*All interested members of the university community are invited to attend
the Final Oral Examination for the degree of **Master of Science** of*

BIANKA KETHEESWARANATHAN

On Friday, September 13th, 2024 at 9:30 a.m. (SSC 3317)

Thesis Title: **Studying the impact of dietary fibre-derived metabolites
on inflammation and neurodevelopment**

Examination Committee:

Dr. Priyanka Pundir, Dept. of Molecular and Cellular Biology (Exam Chair)
Dr. Terry Van Raay, Dept. of Molecular and Cellular Biology
Dr. Ray Lu, Dept. of Molecular and Cellular Biology
Dr. Jasmin Lalonde, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. Terry Van Raay (Advisor)
Dr. Jasmin Lalonde
Dr. Allison Duncan

Abstract: A healthy gut microbiome is essential for proper bidirectional communication of the gut-brain axis. Here, we investigated how fibre supplementation affects the distal colon microbiota composition, its metabolic output via short-chain fatty acid (SCFA) concentrations, and the host's inflammatory response and neurodevelopment through changes in gene expression. Four diets varying in fibre type were analyzed to determine their effects on SCFA production using 1-D 1H NMR analysis, microbiota composition via 16-S rRNA sequencing, and gene expression profiling through quantitative polymerase chain reaction (qPCR) assays using germ-free zebrafish as our model. High-fibre diets, specifically resistant starch (RS) and fruit and vegetable fibre (FVF), significantly increased specific SCFA levels. These changes, however, did not correlate to significant changes in gene expression related to immune response and neurodevelopment. We identified that dietary modulation potentially influences host metabolic health via SCFAs but that does not necessarily result in changes in gene expression, highlighting both the robustness and sensitivity of our model.

Curriculum Vitae: Bianka completed her B.Sc. (Hons.) in Bio-Medical Sciences at the University of Guelph in 2022. She then began her M.Sc in Molecular and Cellular Biology with a collaborative specialization in Neuroscience in Fall 2022 under the supervision of Dr. Terry Van Raay.

Awards: Inaugural Microbiomes at Guelph (MAG) Conference 2023- Poster Competition 1st Prize