



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

GWENDOLYN FREEZE

On Tuesday, August 20, 2024 at 10:00 a.m. (SSC 2315)

Thesis Title: Characterizing Strain Variation in *Parvimonas micra* in the context
of Colorectal Cancer

Examination Committee:

Dr. Jim Uniacke, Dept. of Molecular and Cellular Biology (Exam Chair)

Dr. Emma Allen-Vercoe, Dept. of Molecular and Cellular Biology

Dr. Cezar Khursigara, Dept. of Molecular and Cellular Biology

Dr. Matthew Sorbara, Dept. of Molecular and Cellular Biology

Advisory Committee:

Dr. Emma Allen-Vercoe (Advisor)

Dr. Cezar Khursigara

Dr. Priyanka Pundir

Abstract: *Parvimonas micra*, a gram positive and oral-derived bacterium, has been increasingly seen in the incidence of colorectal cancer (CRC). Despite recent investigations into the role of *P. micra* in CRC, much remains unknown about its association with the disease state, and especially regarding strain-level variation to these effects. This thesis aims to better characterize *P. micra* as an oncomicrobe in CRC by examining its genotypic and physiological traits that may be relevant to pathogenesis, as well as its interactions with host cells *in vitro*. To assess strain variation, six distinctly sourced *P. micra* isolates were studied, derived from both healthy and diseased individuals. *P. micra* strains were found to exhibit traits aligned with its role as an oncomicrobe, such as its ability to persist in gut-related stressors, co-aggregate with other oncomicrobes, auto-aggregate, and produce CRC-relevant metabolites. Furthermore, using Caco-2 cells, isolates demonstrated an ability to induce cell proliferation, adhere to and invade host cells, and a potential to modulate immune responses. Notably, apparent strain variation was seen among the isolates, with those derived from CRC and the type strain demonstrating enhanced virulence traits compared to others, which could be implicated in CRC pathogenesis. The results of this thesis expand our understanding of *P. micra* as an oncomicrobe and is one of the first to comprehensively assess strain variation in the context of CRC. Continued investigation of genetic and physiological differences among *P. micra* isolates is essential to further elucidate strain variation and the role that *P. micra* plays in CRC.

Curriculum Vitae: Gwen completed her Bachelor of Science (Honours) in General Biology at Thompson Rivers University in Kamloops, B.C. in the Spring of 2022. She began her Master of Science in Molecular and Cellular Biology in the Fall of 2022 at the University of Guelph and under the supervision of Dr. Emma Allen-Vercoe

Awards: Ontario Graduate Scholarship (Fall 2023), Canadian Institutes of Health Research (CIHR) Canada Graduate Scholarship – Master’s Award (Fall 2022), University of Guelph Highdale Farms – Arthur and Rosmarie Spoerri Scholarship in Natural Sciences (Fall 2022)