

University of Alabama in Huntsville

LOUIS

Summer Community of Scholars (RCEU and
HCR) Project Proposals

Faculty Scholarship

1-1-2015

The Role of GastroIntestinal Flora and Probiotics in Normal GI Physiology and Disease

Gordon MacGregor
University of Alabama in Huntsville

Follow this and additional works at: <https://louis.uah.edu/rceu-proposals>

Recommended Citation

MacGregor, Gordon, "The Role of GastroIntestinal Flora and Probiotics in Normal GI Physiology and Disease" (2015). *Summer Community of Scholars (RCEU and HCR) Project Proposals*. 350.
<https://louis.uah.edu/rceu-proposals/350>

This Proposal is brought to you for free and open access by the Faculty Scholarship at LOUIS. It has been accepted for inclusion in Summer Community of Scholars (RCEU and HCR) Project Proposals by an authorized administrator of LOUIS.

Title

The Role of Gastrointestinal Flora and Probiotics in Normal GI Physiology and Disease

Faculty and Research Mentor

Mentor: Gordon MacGregor PhD

E-mail: gordon.macgregor@uah.edu

Phone: 256-824-4925

Contact: Dept. of Biological Sciences, 301 Sparkman Drive, SC 369-H, Huntsville, AL, 35899

Project Summary

The human body contains about 100 trillion bacteria in the gastrointestinal tract. That is about 10 times more than the cells in the human body, so we are essentially more bacteria than

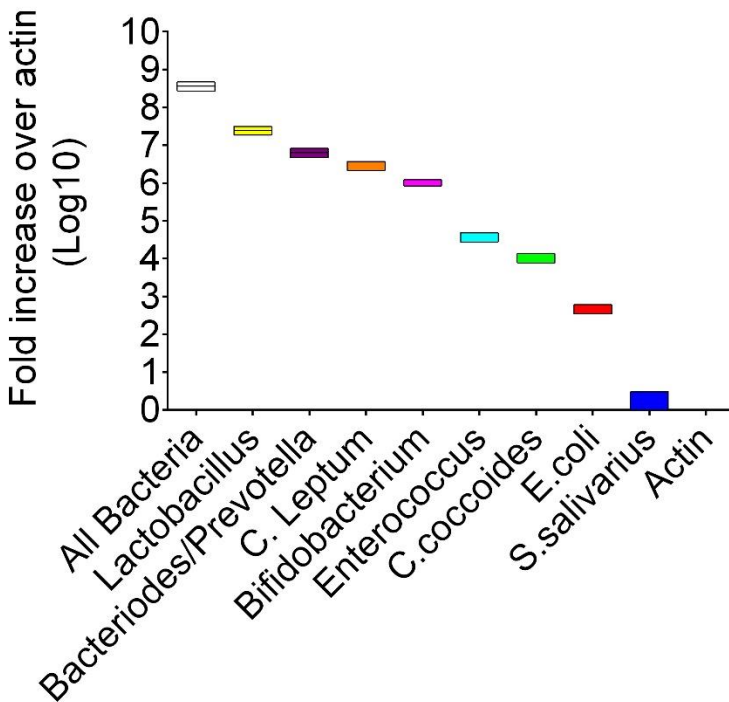


Figure 1. Quantitative PCR of several bacterial families in mouse feces.

human. There are about 500 different types of bacteria in the intestinal microbiota, and they have a complex relationship with gastrointestinal function. Alterations in the composition of the flora alter many physiological systems, including blood pressure, neurotransmitter levels, and can cause intestinal and systemic inflammatory conditions. We will examine the effect of several probiotics from the Escherichia, Bifidobacteria and Lactobacillus families on mouse gastrointestinal physiology. We will administer the

probiotics and monitor mouse physiological markers such as serum glucose, serum lipids, serum neurotransmitters, blood pressure, kidney physiology and gastrointestinal permeability. This data will offer preliminary data on the health-giving beneficial effects of probiotic ingestion.

Student Duties

The student will be investigating the effects of several probiotics on mouse gastrointestinal physiology. The student will dose mice with several probiotics, gather the feces, and study the composition of the microbiota using RT-PCR of the bacteria 16S rRNA. If the probiotic becomes established into the mouse fecal flora, then changes in mouse physiology will be examined, such as plasma metabolites, blood pressure, renal function and gastrointestinal permeability. This will involve learning many physiological principles and using multiple types of instruments. The student will analyze their own data, determine its significance and present it correctly for publication. This will be a real research experience for the student, different to anything experienced in a teaching lab.

The student will learn to handle mice, isolate DNA, RNA, produce cDNA, run gels, and perform RT-PCR. The student will perform quantitative plasma metabolite analysis and studies of gastrointestinal physiological function. The student will be provided with an individual copy of GraphPad Prism software for data plotting and analysis.

Mentor Supervision and Interaction

My goal is to allow the student independence enough to develop, perform and analyze their own experiments. I will guide them, and point them in the correct direction and solve problems that they can't resolve on their own. I will be in the lab fulltime on a daily basis for interaction and bouncing ideas off. I aim to introduce the students to research methodology, correctly performed data analysis, and techniques for correct amalgamation of their data for presentation in the form of a poster or oral presentation for use at a conference.

This project will require full time presence in the lab for 32-40 hours per week, for 10-12 weeks.