

# MBIO 689-2 MICROBIOTA IN HEALTH AND DISEASE TOPICS IN ADVANCED MICROBIOLOGY- 2 CREDITS

FALL 2019

Tuesday 2:00-4:00 PM  
CTR Bldg. Room 601

## Instructors:

Course co-Directors:

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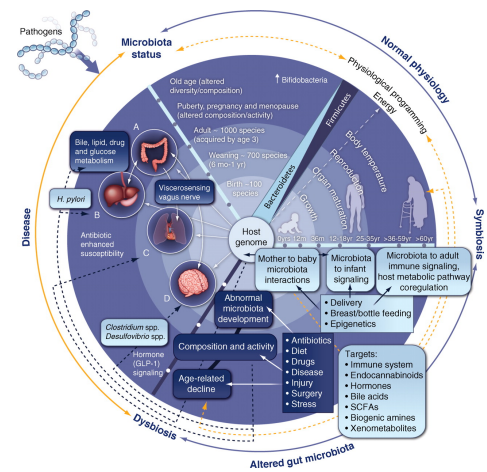
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## Pre-requisites

MBIO 601 Molecular Microbiology or similar course. Each student will need to have a good understanding of basic Microbiology. Contact the course directors if more information about this is needed.

## Purpose of the Course & Course Objectives

Our goal is to deepen your knowledge of the microbiota's involvement in health and diseases and scientific curiosity, and help you become expert at analyzing scientific articles. We anticipate that our diverse backgrounds and experiences will generate fruitful discussion and exchange of opinion. This is an advanced interdisciplinary graduate level class focused on the important role that the microbiota plays at various anatomical sites for the time of birth until death. We will discuss 1) the factors that influence composition of the microbiota, such as breast-fed vs. formula-fed babies, antibiotic treatment, diet, hygiene, 2) the consequences of microbiota dysbiosis on various diseases, and 3) the role of fecal transplants, probiotics and prebiotics in alleviating the harmful effects of imbalance of the microbiota.

The first two sessions will include a discussion based on review articles about the microbiota features and functions at various sites, and an overview of the methods used to analyze its composition. The rest of the weekly sessions will include a short introduction and analysis of a seminal scientific article. You will be asked to explain and/or comment on various aspects of the chosen article during class, and submit answers to a brief questionnaire directed toward analysis of the assigned scientific article at the beginning of the class. Assigned papers will be posted by the instructors the Friday prior the session and handout will be posted prior the session. Instructors may post review articles on their topic (no textbook).

Upon completion of this course, you will be able to:

- 1) Describe approaches used to assess microbiota composition and their metabolites
- 2) Associate your new knowledge about the topics taught to comprehension of current literature
- 3) Analyze a scientific article and evaluate critically the data
- 4) Design experiments based on the current literature
- 5) Communicate your ideas clearly

## Feedback and Grading

The course grade will be based on two open-note take-home exams and participation in the class discussions. A letter grade will be attributed according to the grade scale shown below. You are, therefore, expected to attend class, read the assigned scientific article prior to class and actively engage in class discussions (if unable to attend a class, students should let the instructor and course director know and arrange a meeting with the instructor to remediate).

The assignments will be graded as shown below:

Assignments	Contribution
Take home exams (2)	60%
Oral Participation	40%

Course grade	Approximate percent score
A+	98-100
A	90-97.9
A-	86-89.9
B+	83-85.9
B	79--82.9
B-	74-78.9
C+	69-73.9
C	64-68.9
C-	59-63.9
D	55-58.9
F	<55

You will receive weekly feedback on your participation in class. Additional feedback will be provided for each exam question.

## Assignments

### 1. Take home exams

You will be asked to design hypothesis-driven experiments related to each topic/article. The rationale behind your hypothesis or your approach should be based on the current literature, and the experimental design should address your hypothesis. Your design should also include appropriate controls and proposed expected results based on the current literature. Consulting with other students, lab mates, or mentors on exam questions is not permitted.

	0-2	3-5	6-7	8-10
Rationale	none	Not based on the current literature	Based on the current literature but holes	Based on the current literature & no holes
Design	Does not address hypothesis No good controls	Address somewhat hypothesis & no good controls	Address somewhat hypothesis & fair controls	Address hypothesis & fair/good controls
Expected results	none	Incorrect and not based on the current literature	Correct but not based on the current literature	Correct and based on the current literature

### 2. Oral participation

Your participation will be assessed based on your ability to knowledgeably discuss the assigned scientific article. Level of preparation, content understanding, level of engagement and

communication skills will be evaluated. This would include your ability to 1) describe the question asked by the authors for each figure and the methodology/approach used to address the questions, and 2) analyze the data and interpret the results.

A maximum of 8 points will be given for your explanation of a figure. Additional participation in the overall discussion will also be considered for 2 additional points.

### **Diversity Statement**

University of Louisville strives to foster and sustain an environment of inclusiveness that empowers us all to achieve our highest potential without fear of prejudice or bias. We commit ourselves to building an exemplary educational community that offers a nurturing and challenging intellectual climate, a respect for the spectrum of human diversity, and a genuine understanding of the many differences—including race, ethnicity, gender, socio-economic status, national origin, sexual orientation, disability, and religion that enrich a vibrant metropolitan research university. We expect every member of our academic family to embrace the underlying values of this vision and to demonstrate a strong commitment to attracting, retaining, and supporting students, faculty, and staff who reflect the diversity of our larger society.

### **Policy on Instructional Modifications**

"The University of Louisville is committed to providing access to programs and services for qualified students with disabilities. If you are a student with a disability and require accommodation to participate and complete requirements for this class, notify me immediately and contact the Disability Resource Center (Stevenson Hall, 852-6938) for verification of eligibility and determination of specific accommodations."

### **Plagiarism**

Any plagiarism, or using whole sentences or intact phrases written by others will be verified, resulting in failing grades followed by University disciplinary action.

### **Title IX/Clery Act Notification**

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111). Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.

For more information, see the Sexual Misconduct Resource Guide (<http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>).

**SCHEDULE Fall 2019**  
**Tuesday 3:00-5:00 PM**  
**CTRB Rm 601**

Aug 20	Course Introduction and Microbiome Discussion	Abu Kwaik/Alard
Aug 27	Microbiome metagenomics & Biostatistics	Jala
Sept 3	Microbiota-immune system interaction	Alard
Sept 10	Establishment of the gut microbiome	Abu Kwaik
Sept 17	Cutaneous microbiome	Alard
Sept 24	Gut-brain axis	Alard
Oct 1	Oral microbiome	Miller Dan
Oct 8	<b>No class (Fall break)</b>	
Oct 15	Urinary/Vaginal microbiome	Miller Dick
Oct 22	<b>Mid-term Take home Exam 1</b>	
Oct 29	Role of microbiota in cancer	Bodduluri
Nov 5	Role of microbiota in liver diseases	McClain/Kirpich
Nov 12	Role of microbiota in metabolic diseases	Jala
Nov 19	Role of microbiota in autoimmune diseases	Kosiewicz
Nov 26	Microbiota and susceptibility to infections	Henckel
Dec 3	Probiotics, prebiotics, and fecal transplant	Dryden
Dec 3	<b>Final Take home Exam 2</b>	