



COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title		Code	
Microbiota-Gut-Brain axis research			
Lecturer(s)		Department(s) where the course unit (module) is delivered	
Coordinator: Dr. Aurelijus Burokas Other(s):		Institute of Biochemistry, Life Science Center, Saulėtekio al. 7, LT-10223, Vilnius	
Study cycle		Type of the course unit (module)	
First, second, third		Elective	
Mode of delivery	Period when the course unit (module) is delivered	Language(s) of instruction	
Face-to-face	Semester (Spring, Autumn)	English	
Requirements for students			
Prerequisites: Basic knowledge of biology		Additional requirements (if any):	
Course (module) volume in credits	Total student's workload	Contact hours	Self-study hours
5	132	32	100
Purpose of the course unit (module): programme competences to be developed			
<p>The course aims to develop students' knowledge of the microbial communities that reside within or upon us, and how they impact our health and disease processes. This course will focus on the tools and strategies being used to understand the effects of the microbiota on brain function and behaviour and will focus on all aspects of microbiota science from a basic science, clinical medicine and population-based level and how it interfaces with neuroimmunology, neuroendocrinology, nutrition, neurology & psychiatry. No advanced knowledge of the microbiome is required. Finally, it will point to surrounding nutritional and microbial-based intervention strategies for a variety of brain disorders.</p> <p>The course unit aims to develop:</p> <p><i>Specific competences:</i></p> <ul style="list-style-type: none"> • ability to understand foundations of microbiota: microbial diversity and host-microbiota interactions in health and disease; • ability to apply scientific approach when investigating, analyzing, and explaining microbiota-gut-brain communication; <p><i>Generic competences:</i></p> <ul style="list-style-type: none"> • analytical and critical thinking ; • skills for self-development, learning skills in order to study general science resources; 			
Learning outcomes of the course unit (module)	Teaching and learning methods	Assessment methods	
<ul style="list-style-type: none"> • acquisition of practical skills to work in groups: a) ability to design collectively an experiment, to coordinate the work in the groups, to organize the discussion, to deal with emerging problems, to present the collectively obtained results; b) ability to evaluate critically and adequately the contribution of each member of the group 	Exercises (performance of experiment in a group, search and analysis of information), presentations (preparation and delivery of a presentation), discussions	A presentation (methods and design of experiment, and expected results and problems of experiment)	

Content: breakdown of the topics	Contact hours						Self-study work: time and assignments		
	Lectures	Tutorials	Seminars	Exercises	Laboratory work	Internship/work placement	Contact hours	Self-study hours	Assignments
1. Introduction to microbes and the human microbiota	2						2	8	Scientific literature reading.
2. Studying the microbiota	2						2	8	Scientific literature reading.
3. Making sense out of microbial data	2						2	8	Scientific literature reading.
4. The human gut microbiota and health	2						2	8	Scientific literature reading.
5. Gut microbe-host interactions: beyond nutrition	2						2	8	Scientific literature reading, preparation of presentations, practical works.
6. The microbiota-gut-brain axis	4		2				6	16	Scientific literature reading. Performing oral presentations and preparing the written paper.
7. Gut-brain communication in mental health	2		2				4	12	Scientific literature reading. Performing oral presentations and preparing the written paper.
8. Critical windows: The microbiota-gut-brain axis in neurocognitive and social development	2						2	8	Textbooks and scientific literature reading.
9. The impact of nutrition, metabolism and the microbiota on the brain: lessons from model organisms	2		2				4	10	Scientific literature reading. Performing oral presentations and preparing the written paper.
10. How to design, analyse, and interpret microbiota-gut-brain axis studies	4		2				6	14	Scientific literature reading.
Total	24		8				32	100	

Assessment strategy	Weight %	Deadline	Assessment criteria
Personal task – oral presentation	30	During the semester	During the seminars students have to make two oral presentations on given or freely selected themes. Only after fulfilling this student is allowed to participate in the final exam.
Personal task – written paper	30	During the semester	Students prepare a paper 15-25 pages. Reference list has to have at least 15 sources that should represent books, papers from scientific journals, conferences and other referred sources. Only after presenting the paper in electronic format student is allowed to participate in the final exam.
Exam	40	During the exam session	Written exam consists of 20 open questions, each evaluated 0.5 points, and duration is 1.5 hours.

Author	Year of publication	Title	Issue of a periodical or volume of a publication	Publishing place and house or web link
Compulsary reading				
Editors-in-Chief: Jacques Ravel, USA Elizabeth Wellington, UK		Journal <i>Microbiome</i>		https://microbiomejournal.biomedcentral.com/about
Optional reading				
Scott C. Anderson, John F. Cryan Ted Dinan	2017	The Psychobiotic Revolution: Mood, Food, and the New Science of the Gut-Brain Connection		National Geographic