Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Mikrobiote – kompleksne združbe mikroorganizmov**
Course title:	**Microbiota – complex microbial communities**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študij Ekološke znanosti, 3. stopnja		1. ali 2.; 1st or 2nd	1.- 4.; 1st-4th
Doctoral Study Ecological Sciences, 3rd degree			

Vrsta predmeta / Course type Izbirni/Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
10	-	-	20	-	150	6

Nosilec predmeta / Lecturer: Prof. dr. Maja Rupnik

Jeziki / Languages:	
Predavanja / Lectures:	slovenski / Slovene
Vaje / Tutorial:	slovenski / Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Osnovno znanje s področja mikrobiologije in molekularne biologije

Prerequisits:

Basic knowledge in microbiology and molecular biology

Vsebina:

Predmet vključuje mikrobne združbe, ki naseljujejo različne predele različnih gostiteljev, njihov pomen ter metode, ki se uporabljajo pri njihovem preučevanju

- različni tipi mikrobiot
- mikrobiota prebavil pri človeku in živalih
- bakterijske, glivne in virusne mikrobiote
- uporaba '-omik' (genomika, metabolomika) in analize kompleksnih

Content (Syllabus outline):

Course will cover different microbiot types from different hosts, their role in host biology and methodological approaches for their analysis:

- intestinal microbiota in humans and animals
- microbiota in other regions
- bacterial, fungal and viral microbiota
- '-omic' approaches (genomics, metabolomics) and analysis of

podatkov za proučevanje mikrobnih združb - interakcije med mikroorganizmi - interakcije mikroorganizem – gostitelj - interakcije mikrobiot v živem in neživem okolju - vplivi okolja na sestavo in delovanje mikrobiot	complex data sets in studies of microbial communities - microbe-microbe interactions - microbe-host interactions - interactions among different microbiomes - environmental influences on microbiota structure and function

Temeljni literatura in viri / Readings:

- Izbrani pregledni članki s področja (revije Nature Review Microbiology; Cell&Host, Microbiome)
- HORVAT, Sabina, RUPNIK, Maja. How and why to analyze microbiota : a quick guide for clinicians = Kako in zakaj analiziramo mikrobioto : hitri vodnik za zdravnike. Acta medico-biotechnica : AMB. [Tiskana izd.]. 2020, vol. 13, [no.] 1, str. 11-22, ilustr. ISSN 1855-5640. https://journals.um.si/index.php/amb/article/view/1601, https://dk.um.si/IzpisGradiva.php?id=83694, DOI: 10.18690/actabiomed.191. [COBISS.SI-ID 24116483]

Flint H J, 2020, Why gut microbes matter, Springer

Cilji in kompetence:	**Objectives and competences:**
Poznati vlogo posameznih mikrobnih skupin za funkcionalnost mikrobiot Poznati vlogo mikrobiot ter predvsem črevesne mikrobiote za gostitelja Poznati možne vplive okolja na delovanje mikrobiot Poznati nabor sodobnih metod, ki se uporabljajo za analizo kompleksnih mikrobnih združb, ki tvorijo mikrobiote	To understand the role of different microbial groups for functional microbiota To understand the role of microbiota (gut and other regions) for the host To understand environmental influences on different types of microbiota To be familiar with methods used in microbiota research

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študent razume in zna opisati pomen mikrobiot za gostitelja Razume in zna opisati mikrobiote povezane s človekovim okoljem Zna našteti pomembne predstavnike v izbranih mikrobiotah Pozna različne metode za študij različnih mikrobiot Pozna dejavnike, ki vplivajo na sestavo mikrobiot	**Knowledge and understanding:** The student understands and can describe the importance of the microbiota for the host Understands and can describe the microbiota associated with the human environment Student can list the important representatives in the selected microbiota Student knows different methods for studying microbiota Student is familiar with factors that can modulate microbiota
Prenesljive/ključne spretnosti in drugi atributi:	**Transferable/Key Skills and other attributes:**

- študent teoretično pozna sodobne metode, ki se lahko uporabijo tudi v drugih raziskavah - obvladovanje področja z obsežno literaturo (izbor ustrezne literature)	- methodological knowledge - managing and selecting apropriate literature

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja • Demonstracijski prikazi praktičnih primerov • Vaje	• Lectures • Demonstration of practical examples • Practical work

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Seminarska naloga ali poročilo iz vaj	50	Short writen report or seminar
Ustni izpit	50	Oral exam

Reference nosilca / Lecturer's references:

1. HORVAT, Sabina, MAHNIČ, Aleksander, MAKUC, Damjan, PEČNIK, Klemen, PLAVEC, Janez, **RUPNIK, Maja**. Children gut microbiota exhibits a different composition and metabolic profile after in vitro exposure to Clostridioides difficile and increases its sporulation. Frontiers in microbiology. 2022, vol. 13, 1042526, str. 1-11, DOI: 10.3389/fmicb.2022.1042526. [COBISS.SI-ID 134179587],
2. MAHNIČ, Aleksander, PINTAR, Špela, SKOK, Pavel, **RUPNIK, Maja**. Gut community alterations associated with Clostridioides difficile colonization in hospitalized gastroenterological patients with or without inflammatory bowel disease. Frontiers in microbiology. 2022, vol. 13, str. 1-8, https://doi.org/10.3389/fmicb.2022.988426, [COBISS.SI-ID 120477443]
3. MAHNIČ, Aleksander, BREZNIK, Vesna, BOMBEK, Maja, **RUPNIK, Maja**. Comparison between cultivation and sequencing based approaches for microbiota analysis in swabs and biopsies of chronic wounds. Frontiers in medicine. 2021, vol. 8, str. 1-10, DOI: 10.3389/fmed.2021.607255. [COBISS.SI-ID 66168067]
4. MAHNIČ, Aleksander, BRESKVAR, Martin, DŽEROSKI, Sašo, SKOK, Pavel, PINTAR, Špela, **RUPNIK, Maja**. Distinct types of gut microbiota dysbiosis in hospitalized gastroenterological patients are disease non-related and characterized with the predominance of either Enterobacteriaceae or Enterococcus. Frontiers in microbiology. 2020, vol. 11, str. 1-10, DOI: 10.3389/fmicb.2020.00120. [COBISS.SI-ID 33165351]
5. MAHNIČ, Aleksander, AUCHTUNG, Jennifer, POKLAR ULRIH, Nataša, BRITTON, Robert A., **RUPNIK, Maja**. Microbiota in vitro modulated with polyphenols shows decreased colonization resistance against Clostridioides difficile but can neutralize cytotoxicity. Scientific reports. 2020, vol. 10, no. 8358, 1-11 str., DOI: 10.1038/s41598-020-65253-0. [COBISS.SI-ID 16205827]
6.
7.
8.