Academic year 2021./2022.

Course title

Microbiological methods in dental medicine

Department

Department of Medical microbiology and parasitology, School of Medicine University of Zagreb

Adress Šalata 3

Total ECTS points 6

Course leader

Prof. Ana Budimir, MD; PhD

Course associates

Assist prof Sanja Pleško

Assoc prof Ivona Bago

Assoc prof Dragana Gabrić

Teaching plan

	No. classes
Lecture	6
Seminar	14
Practical	10
Total	30

1 class = 45 minutes

Course description

Microbiological methods in dental medicine is a part of Postgraduate doctoral study of Dental Medicine. The course offers an overview of microbiome in ora cavity, principles of detection of microorganisms in dental plaque, caries and parodontal disease pathoges. Methods of detection and identification of pathogens signifficant for infections of oral cavity, salivary glands and distant infections are also incorporated in the course.

Students will learn principles and methods of sampling for cultivation and molecular detection of bacteria and funghi in oral caviry (swabs, paper point, aspriates). The role of transport containers, preservative fluids and gels will be addressed for fastidious and anaerobic bacteria signifficant in dental medicine, as well as principles of storage and transport for molecula detection. The course content cntains basic principles of cultivation of aerobic and anaerobic bacteria in dental medicine, and procedures for quantification of bacteria and funghi. Special attention will be payed to mofphological diferentiation of microorganisms, automated systems, VITEK2 and MALDI TOF. Biofilm is an important subject in dental medicine, and will be investigated in details: pathogenesis, prerequisites for biofilm, survival, visualisation, prevention of growth, and removal. Molecular microbiology methods, especialy PCR; RT PCT and sequencing will be addressed in various teaching forms. A part of course content is also a direct detection of resistance genes in dental samples.

Learning outcomes

1. Upon completion of the course, students will be able to identify and describe absic conventional and modern microbiological methods used for detection of pathogens in dental medicine
2. Will be able to apraise different terms in metagenomics, and genetic analysis of microorganisms in oral cavity .
3. Students wil be able to interprete various results of microbiological analyses and tests, and differentiate signifficant pathoges from oprortunistic ones.
4. Will be able to explain the conditions for biofilm formation, to recognize biofilm visualized by different techiques
5. Students will be able to compare and evaluate different microbiological approaches and techniques in scientific publications in teh field of dental medicine.

Course contet

Lecture

	Lecture topics	**Number of classes/hours**
1.	Introduction to microbiological methods	1
2.	Microbiota, microbiome, resistome in oral cavity	1
3.	Application of conventional microbiological methods and molecular microbiology methods in dental medicine	
4.	Microbiological aspects and characteristisc of biofilm in dental medicine	
5.		1
6.		1
7.		
8.		
9.		1
10.	-	-

1 sat = 45 minuta

Seminari

	Seminar topics	**Number of classes/hours**
1.	Methods for biofilm detection, principles of diagnostics, biofilm visualisation methods	-
2.	Biofilm in endodontics	-
3.	Dental implants and biofilm	-
4.	Prevention of biofilm formation, biofilm removal methods, in vivo and in vitro	-
5.	Principles of MALDI-TOF technology in dental microbiology	-

6.	Identification of microorganisms –biochemical methods and protein analysis	-
7.	The choice of methods for testing of sustainability and viability of microorganisms	-
8.	-	-
9.	-	-
10.	-	-

1 sat = 45 minuta

Vježbe

	practicals topics	**Number of classes/hours**
1.	Research planing and use of microbiological methods in dental medicine	-
2.	Sample preparation, sampling and storage for mcirobiology analysis	-
3.	Removal of the intracanal biofilm	-
4.	Preparation of strains for biofilm formation	-
5.	Principles of sampling, preparation, isolation and purifiction of NA for molecular diagnostisc	-
6.	PNA FISH techique for biofilm detection	-
7.	Quantification of microorganisms-macro and micro-dillution	-
8.		-
9.		-
10.		-

1 class = 45 minutes

Literature

Molecular Oral Microbiology
Publisher: Caister Academic Press
Edited by: Anthony H. Rogers
2008. ISBN: 978-1-904455-24-0

The Root Canal Biofilm
Luis E. Cha´vez de Paz • Christine M. Sedgley •Anil Kishen-Editors
Springer Series on Biofilms
ISBN 978-3-662-47414-3 ISBN 978-3-662-47415-0 (eBook)
DOI 10.1007/978-3-662-47415-0

Molecular Medical Microbiology
3rd Edition - May 1, 2022

Editors: Yi-Wei Tang, Musa Hindiyeh, Dongyou Liu, Andrew Sails, Paul Spearman, Jingren Zhang
ISBN: 9780128186190

Molecular microbiology : diagnostic principles and practice

David H Persing, Fred C. Tenover, Randall T. Hayden, Greet Ieven, Melissa B. Miller, Frederick S. Nolte

ASM Press, Washington, DC

CV (*curriculum vitae*) and bibliography of course leader

	III.	
1.	**Name and surname:**	Ana Budimir
2.	**Title:**	PhD, prof., MD
3.	**Teaching / scientific degree:**	Full professor
4.	**Date of the last teaching / scientific degree obtained:**	January 2019
5.	**Department / Clinic:**	University of Zagreb School of Medicine, University hospital centre Zagreb
6.	**Mailing address:**	Kišpatićeva 12
7.	**Phone / mobile:** (mandatory!)	01 2367 3, 098392994
8.	**E-mail:** (mandatory!)	abudimir@kbc-zagreb.hr
9.	**CV:**	Adte of birth: March 13th 1973 Employment: 2021- present: Head of the Department of Clinical and Molecular Microbiology, University Hospital Centre Zagreb, 2013-2019- associated professor School of Medicine, Department of medical microbiology and parasitology, 2009- 2021, Department of cilinical and molecular microbiology, Head of the Laboratory for diagnostics, typing and surveillance of hospital infections typing of bacterial pathogens, hospital-acquired infections, 2008-2013.- University of Zagreb School of Medicine, Assistant professor, Medical microbiology 2006-2009, University Hospital Centre Zagreb, Clinical microbiologist 2002 -2006 , specialization in Clinical microbiology, 1997-2000, Health Center Medveščak Zagreb, internship -General medicine Research projects: collaborator in Croatian science foundation: InWaShed-MP " HRZZ- IP-2020-02-7575, since February 2021. godine HRZZ Research Project (IP-11-2013) Advanced textile materials by targeted surface modification, Acronym: ADVANCETEX. Principal Investigator (PI): Sandra Bischof, University of

		Zagreb Faculty of Textile Technology, Review expert for Training strategies in infection control in Europe (TRICE-IS) od 2014. Laboatory coordinator for Croatia in APRES (Appropriateness of prescribing in primary health care in Europe with respect to antibiotic resistance) FP7 framework. National coordinator of project PROHIBIT- Prevention of Hospital Infections by Intervention and Training, FP7, National representative for TRICE (Project Infection Control Training Needs Assessment in Europe), ECDC-a (European Centre for Disease Control and Prevention), Stockholm. Over 80 publications in CC journals, 1463 citation, H index -16. Scientific interests: molecular detection of antimicrobial resistance, healtcare associated infections. Teaching: Coordinator of PhD course in Faculty of Dental medicine, Zagreb. Teaching in courses in microbiology, HCAI, quality of care, infectious diseases, epidemiology, and related subjects, for graduate and postgraduate students.
10.	**Selected publications:**	1. Sealing Efficacy of the Original and Third-Party Custom-Made Abutments-Microbiological In Vitro Pilot Study. Smojver, I, Bjelica, R, Catic, A; Budimir, A Vuletic, M, Gabric, D. MATERIALS.Volume15.Issue4.Article Number1597 DOI10.3390/ma15041597. PublishedFEB 2022 2. Evaluation of sealing ability of four bioceramic root canal sealers and an epoxy resin-based sealer: An in vitro study. Vukmanovic, L ; Antunovic, M ; Budimir, A ; Kabil, E ; Anić, I ; Bago, I. Saudi Endodontic Journal (1658-5984) 11 (2021), 1; 66-72 3. Short-Term Antibacterial Efficacy of Three Bioceramic Root Canal Sealers Against Enterococcus Faecalis Biofilms. Munitic, MS, Budimir, A Jakovljevic, S, Anic, I; Bago, I ACTA STOMATOLOGICA CROATICA, Volume54, Issue1 Page3-9. DOI10.15644/asc54/1/1 4. The photo-activated and photo-thermal effect of the 445/970 nm diode laser on the mixed biofilm inside root canals of human teeth in vitro: A pilot study. Katalinić I, Budimir A, Bošnjak Z, Jakovljević S, Anić I. Photodiagnosis Photodyn Ther. 2019 Jun;26:277-283. doi: 10.1016/j.pdpdt.2019.04.014. Epub 2019 Apr 14. 5. Antimicrobial Efficacy of Photodynamic Therapy and Light-Activated Disinfection Against Bacterial Species on Titanium Dental Implants. Azizi B, Budimir A, Mehmeti B, Jakovljević S, Bago I, Gjorgievska E, Gabrić D. Int J Oral Maxillofac Implants. 2018 Jul/Aug;33(4):831-837. doi: 10.11607/jomi.6423. 6. Clinical and Salivary Findings in Patients with Different Types of Orthodontic Brackets. Jurela, A; Sudarevic, K ; Budimir, A; Brailo, V , Brzak, BL, Jankovic, B. ACTA STOMATOLOGICA CROATICA. Volume53. Issue3. Page224-230 DOI10.15644/asc53/3/4