Universitat Autònoma de Barcelona

2022/2023

Medical Microbiology

Code: 101928
ECTS Credits: 6

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OB	3	1

Contact

Name: Silvia Capilla Rubio
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Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Carme Muñoz Batet
Maria Teresa Tórtola Fernández
Elisenda Miró Cardona
Maria Nieves Larrosa Escartin
Ferran Navarro Risueño
Gema Fernandez Rivas
Montserrat Garrigo Fullola
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Juan José González López
Antonio Casabella Pernas
Marina Alguacil Guillen
Carla Berengua Pereira
Pere Joan Cardona Iglesias
Mateu Espasa Soley
Maria Dolores Quesada Fernandez
Sonia Molinos Abos
Elena Sulleiro Igual
Maria Alba Rivera Martinez

Prerequisites

General knowledge of cellular and molecular biology, anatomy, physiology and microscopic structure of human apparatus and systems.

Objectives and Contextualisation

General

To give the student a general knowledge about the microorganisms responsible for human infectious diseases and the basic concepts of physiopathology, diagnosis and prophylaxis from an etiological perspective. To enable him/her to understand the advantages and disadvantages, and ultimately to guide and interpret the different diagnostic techniques of infectious diseases.

Objectives of the theoretical classes

To provide specific knowledge on the general characteristics of microorganisms, their pathogenicity mechanisms and host defence mechanisms. Familiarize the student with microbiological diagnostic techniques and the general principles of treatment and prevention of infectious diseases. Systematically review the main bacteria, fungi, viruses and parasites responsible for infections.

Objectives of the practices

The general objective of the internship is to give the student a broad view of current microbiological diagnostic techniques, their value and limitations. First, it is necessary for the student to personally perform and know the nature of the different techniques of direct diagnosis (microscopic examination, culture isolation, detection of antigens and molecular biology techniques) and indirect diagnosis (serology). Then, in a second phase, he must know the possibilities of their application in the diagnosis of infectious diseases, their advantages and disadvantages.

Competences

- Display knowledge of the bases and elements applicable to the development and validation of diagnostic and therapeutic techniques.
- Display knowledge of the basic life processes on several levels of organisation: molecular, cellular, tissues, organs, individual and populations.
- Display knowledge of the concepts and language of biomedical sciences in order to follow biomedical literature correctly.
- Display theoretical and practical knowledge of the major molecular and cellular bases of human and animal pathologies.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Describe the most important groups of pathogenic microorganisms .
2. Explain the relationships between a possible pathogen and its host.
3. Identify the techniques used in the detection and identification of pathogens.
4. Recognise the role of microorganisms as agents of disease or toxicological problems in human beings, animals and plants.
5. Understand the concepts and language of microbiology and consult the scientific literature in the area of microbiology.
6. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Content

Theoretical program:

Introduction to Medical Microbiology and Parasitology. Groups of living beings with pathogenic capacity for man. Native flora of man.
Infectious diseases. Reservoir and transmission of pathogenic microorganisms. Pathogenesis of infections. Epidemiology. Diagnosis and treatment.
Host-parasite relations. Mechanisms of microbial pathogenicity and defence mechanisms.
General characteristics of bacteria.
General characteristics of fungi.
General characteristics of viruses.
General characteristics of protozoa and helminths.
Microbiological diagnosis of infectious diseases.
Antibacterial and antifungal drugs. Mechanisms of resistance.
Antiviral drugs. Classification. Mechanism of action.
Staphylococci. General characteristics. Pathogenic action. Staphylococcus aureus. Pathogenic action. Epidemiology. Treatment. Inactivated enzymes of penicillins. Other staphylococci with pathogenic capacity for man.
Streptococci and enterococci. Classification. Microbiological characteristics. Streptococcus pyogenes. S. agalactiae. Streptococci of the viridans group. S. pneumoniae. Genus Enterococcus.
Neisseria. Bacteriological characteristics. Habitat. Pathology. Diagnosis. Treatment.
Enterobacteria. Definition. Habitat. Primary and opportunistic pathogenic enterobacteria.
Pseudomonas and other non-fermenting gram-negative bacilli. Genus Acinetobacter.

Spirochetes. Main genera Treponema, Borrelia and Leptospira. Microbiological characteristics. Habitat. Pathology. Diagnosis. Treatment.
Mycoplasmas, chlamydia and rickettsia. Bacteria of forced intracellular life. Bacteriological characteristics. Habitat. Pathology. Diagnosis. Treatment.
Agents causing cutaneous and subcutaneous mycosis. Dermatophytes. Sporothrix shenckii. Mycetoma agents. Chromoblastomycosis agents.
Primary pathogenic fungi and opportunistic yeasts causing systemic mycosis. Genera Candida and Cryptococcus. Appendix: Pneumocystis jiroveci.
Systemic opportunistic infections. Upper filamentous fungi hyalinos Aspergillus, Scedosporium and others. Pathology and diagnosis. Lower filamentous fungi: zygomycetes. Pathology and diagnosis.
Surrounding DNA virus. Herpesvirus. Classification. Biological characteristics. Pathology. Other DNA viruses with surrounds.
Virus DNA without surrounds. Adenovirus and papillomaviruses. Biological characteristics. Pathology. Papilloma and cancer. Parvovirus and other naked DNA viruses.
RNA virus without surrounds. Picornavirus. REOVIRUS (Rotavirus). Calicivirus (Norovirus). Classification. Biological characteristics. Pathology. Diagnosis and treatment. Other RNA viruses without surrounds.
RNA virus with surrounds. Ortomixovirus and paramixovirrus and other respiratory viruses. Classification. Biological characteristics. Pathology. Diagnosis and treatment. Other RNA viruses with surrounds.
Hepatitis virus. Classes of biological characteristics. Epidemiology: geographical distribution, transmission. Clinical. Persistence. Chronic hepatitis: cirrhosis and cancer. Diagnosis. Treatment: antivirus, interferons.
Retrovirus. Classification. Replication. AIDS virus. Biological characteristics. Pathology. Diagnosis. Treatment. Other retroviruses of interest. Retroviruses and cancer.
Vaginal and intestinal protozoosis. Entamoeba histolytica. Trichomonas and Giardia. Microbiological characteristics. Habitat. Pathology. Diagnosis. Treatment. Schistosomes. Biological characteristics. Geographical distribution. Life cycles. Pathology. Diagnosis. Treatment.
Systemic Protozoosis. Plasmodium. Classification. Biological characteristics. Transmission and life cycle. Geographical distribution. Diagnosis. Prophylaxis and treatment. Leishmania. Biological characteristics. Geographical distribution. Life cycle. Pathology. Diagnosis and treatment.

Parasites. Systemic Protozoosis. Trypanosoma. Biological characteristics. Geographical distribution. Life cycle. Pathology. Diagnosis and treatment. Toxoplasma. Biological characteristics. Transmission and life cycle. Diagnosis and treatment.
Platelmintos of interest in medicine. Tenías. Biological characteristics, life cycles. Pathology. Diagnosis. Treatment. Platelmints of restricted distribution. Nematodes. Pinworms and tartars. Biological characteristics, life cycles. Pathology. Diagnosis. Treatment.
Nematodes of restricted distribution: hookworm. Necator. Strongyloids. Filarias. Biological characteristics, life cycles. Pathology. Diagnosis. Treatment.

LABORATORY PRACTICES:

Total hours: 13 hours

Microscopy: Observation of fresh samples. Staining.
Clinical sample. Culture, type of culture media, incubation atmosphere, temperature and time.
Bacterial identification methods and antimicrobial sensitivity tests. Interpreted antibiogram concept.
Antigen detection techniques. Diagnosis based on antigen detection.
Genetic technology applied to diagnosis.

CLASSROOM PRACTICES:
Sexually transmitted infections. Urinary tract infection.
Respiratory infection.
Infection of the central nervous system.
Sepsis and endocarditis.
HIV infections. Hepatitis

Methodology

The teaching of the Biomedical Science Grade of the UAB is distributed on a rotating basis to the Teaching Units of Vall d' Hebron, Sant Pau, Germans Trias i Pujol and Parc Taulí.

In relation to the Medical Microbiology subject, all theoretical teaching is taught each year in one of the four Teaching Units indicated on a rotating basis.

The practical teaching of the Medical Microbiology subject is carried out every year, simultaneously, in the four Teaching Units, distributing the students in four equal groups to go each group to one of the four Units.

The teaching methodology will consist of theoretical classes, classroom practices and laboratory practices.

1. Theoretical classes will be taught in the form of master classes. Classroom practices and laboratory practices will be carried out in groups of maximum 20 students as a way to have an open discuss teaching.
2. In laboratory practices students will develop different techniques to become familiar with the working methods of the Microbiology laboratory used for the etiological diagnosis of infectious diseases.
3. In the classroom the basic principles of etiological diagnosis of infectious diseases will be reviewed and discussed with the students, based on real clinical cases.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Masterclasses	36	1.44	6
Practicum and seminars	23	0.92	6
Type: Autonomous			
Autostudy	87	3.48	

Assessment

The laboratory practice and classroom practice are compulsory and are essential to be evaluated of the subject.

The practical examination final rate will include the evaluation of laboratory and classroom practices. This exam will consist of short written questions.

The theoretical examination will consist of test and/or short written questions (100%), depending on each Teaching Unit.

There is the possibility to release material by means of 2 partial theory evaluations. A grade of 6 or higher is required to pass these exams.

The practical examination will take place at the time of the second partial evaluation of the subject.

Students with subject not released by partials may take a final make-up exam.

The final grade will be obtained by combining the theoretical grade (70%) and the practical grade (30%).

In order to pass the course it will be necessary to obtain an overall grade equal to or higher than 5 out of 10.

Students who have completed less than 50% of the course activities will be given the grade of "not evaluable".

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practical examination	30%	2	0.08	3, 6
Theoretical examination	70%	2	0.08	5, 1, 2, 4, 6

Bibliography

Specific Bibliography

Prats G. Medical Microbiology and Parasitology. Madrid. Ed. Médica Panamericana. 2013.
Murray PR., Rossental KS., Pfaller MA. Medical Microbiology. 9th Ed. Philadelphia. Elsevier. 2020.
Prats G. Clinical Microbiology. Madrid. Ed. Médica Panamericana. 2006.

Reference Bibliography

Mandell, Douglas y Bennett. Enfermedades Infecciosas. Principios y práctica. 9a Edición. Elsevier España. 2020.
Ausina V., Moreno Guillén S. SEIMC Treaty on Infectious Diseases and Clinical Microbiology. Madrid. Editorial Médica Panamericana. 2006.

Farreras-Rozman. Medicina Interna. 19a Edición. Elsevier España. 2020

Interesting links

www.seimc.org
www.escmid.org
www.scmimc.org
www.asm.org
www.cdc.gov

Software

Does not require any specific software