

Module: 69870 – Bacteriology and Immunology 3 CFU; 33 hours: 25 of frontal lectures and 8 hours of practical lessons (for 4 groups)
Component of the C.I. MICROBIOLOGY AND PARASSITOLOGY
Single cycle degree in Veterinary Medicine
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Objectives of the course: at the end of this course the student acquires the basic principles of bacteriology and immunology necessary for the study of the main mechanisms governing the relations between causative agent and animal host; the student knows the main methods for diagnosis and immunization

Chapter's objective	Topic	Specific contents	Hours
1. OPENING LECTURE (TOT. 1 HOURS)	<i>Opening lecture</i>	Aims of the course, presentation of the detailed programme of the course, suggested textbooks, organization of practical lessons, procedures concerning the final exam, introduction of teacher co-workers who will be involved in practical training	1
2. GENERAL BACTERIOLOGY (TOT. 3 HOURS)	<i>Functional structure of the bacterial cell</i>	Functional structure of the bacterial cell: capsule, cell wall, cytoplasmic membrane, flagella, fimbriae and pili, nucleoid, plasmid, ribosome, bacterial spore	2
	<i>Bacterial cultivation</i>	Factors conditioning the bacterial growth: a) nutritional factors (transport media, liquid and solid culture media); b) environmental factors (temperature, oxygen, pH, water activity). Phases of bacterial replication. Duplication time. Bacterial growth curve in liquid media.	1
3. BACTERIAL GENETICS (TOT. 3 HOURS)	<i>Mutations</i>	Bacterial genome, mutations, mutagenic agents, Ames test, phase variations.	1
	<i>Ricombinations</i>	Horizontal transfer of genetic material in bacteria: transformation, transduction, lysogenic conversion, conjugation, plasmids and antibiotic-resistance, transposons.	2
4. BACTERIA AS PATHOGEN (TOT. 2 HOURS)	<i>Interection microrganism-host</i>	Saprophytism, commensalism, parasitism. Colonization, infection, infectious disease, pathogenicity, virulence.	1

	<i>Pathogenic properties of bacteria</i>	Colonization factors, diffusion factors, factors which interfere with phagocytosis, toxic factors (exotoxins and endotoxins)	1
5. METHODS FOR MICROORGANISM CONTROL (TOT. 4 HOURS)	<i>Physical and chemical agents in the control of microorganisms</i>	Use of physical and chemical agents for the control of microorganisms, sterilization, disinfection, antiseptics, sanitization.	1
	<i>Antibiotics and antibiotic-resistance</i>	Antibiotic actions, tests to determine the antibiotic activity: MIC, MBC, Kirby-bauer test. Antibiotic-resistance: genetic bases and mechanisms.	3
5. SPECIAL BACTERIOLOGY (TOT. 4 HOURS)	<i>Classification of bacteria</i>	Classification, nomenclature, identification. Typing of bacteria	1
	<i>Eubacteria Gram-negative, Gram-positive and without cell wall</i>	Approach to the study of special bacteriology and focus on some genera	2
7. IMMUNOLOGY (TOT. 9 HOURS)	<i>Generality and phases of the immune response</i>	Generality. Phases of antigen recognition, antigen processing, cell activation, effector functions	2
	<i>Antigens and immunogenicity</i>	Antigens and factors conditioning the immunogenicity. Antigens of microorganisms and of animal cells.	1
	<i>Humoral immunity</i>	Antibodies: structure, antibody classes, monoclonal antibodies. B lymphocytes and antibody production. Kinetics of antibody production. Mode of actions of antibodies. Interaction antigen-antibody. Genetics of diversity among antibodies. Theory of clonal selection. Complement.	2
	<i>Mucosal immunity and passive immunity</i>	IgA and mucosal protection. Passive immunity. Failure of passive transfer.	0.5

	<i>Cell-mediated immunity</i>	Major Histocompatibility Complex (MHC). Structure of class I MHC and class II MHC molecules. Exogenous and endogenous processing of antigen and presentation. Cellular interactions and immunoregulation. Effector mechanisms of cell-mediated immunity.	2
	<i>Serology</i>	Definitions and serological tests	1,5

PRACTICALS

LABORATORY DIAGNOSIS OF BACTERIAL DISEASES	<i>Microscopical exam</i>	Correct use of light microscope. Gram staining techniques.	2
	<i>Bacteria isolation</i>	Methods of collection, storage and transport of samples to be subjected to bacteriological exams. Culture techniques. Techniques for bacteria identification. Antimicrobial Susceptibility Testing.	2
	<i>Bacterial identification and antimicrobial susceptibility test</i>	Bacterial identification by Maldi-Tof and genome evaluation; Kirby-bauer method	2
	<i>Problem solving</i>	Filling out of a ppt, performed by the teacher, with informations collected during previous activities and results communication	2