



UNIVERSITÀ DI PISA MICROBIOLOGY AND PARASITOLOGY

FRANCESCA MANCIANTI

Anno accademico	2017/18
CdS	VETERINARY MEDICINE
Codice	117GG
CFU	10

Moduli	Settore/i	Tipo	Ore	Docente/i
MICROBIOLOGIA ED IMMUNOLOGIA VETERINARIA	VET/05	LEZIONI	68	PATRIZIA BANDECCHI
PARASSITOLOGIA VETERINARIA	VET/06	LEZIONI	68	FRANCESCA MANCIANTI

Learning outcomes

Knowledge

The student that successfully completes the course will acquire the personal skills in the recognition of main parasites. Furthermore the course will provide the students with the main concepts of bacteriology, of virology and of essential mechanisms involved in the immune response. This knowledge will allow to approach the study of Parasitic and Infectious Diseases, in different aetiology, epidemiology and prophylaxis, as well as Veterinary Pathology, Inspection of food of animal origin and Veterinary Clinics

Assessment criteria of knowledge

The student will be assessed on his/her demonstrated ability to discuss the main course contents using the appropriate terminology.

Methods:

- Final oral exam
- Periodic written tests

Further information:

The weighting of Microbiology periodic written tests is 60% in respect to final oral exam, while Parasitology periodic written tests is 40% in respect to final oral exam

Skills

At the end of the course the student will acquire the following skills

1. Interpretation of the main diagnostic test used for infectious diseases
2. Recognize parasites that infect different animal species

Assessment criteria of skills

Final exam will verify the following

During practical activities, supervised by the teacher, the accuracy and precision of the activity for each student will be evaluated. Periodic written test and the final exam will verify the attitude of each student to recognize different bacterial, viral, mycotic and parasitic infectious agents and the attitude to the interpretation of the different diagnostic methods.

Behaviors

During lectures and practical activities the student will be trained to work in a team and to behave appropriately in accordance with applicable laboratory safety standards. It will also be trained to develop good reasoning for the interpretation of the main diagnostic tests, for the identification of microorganisms, and for the recognition of the major parasites and their stages.

Assessment criteria of behaviors

The assessment of the behavior will be carried out by observing the correctness of the activities carried out in the laboratory and the ability to manage and organize the group work. During the final exam, the student's language property will also be evaluated.

Prerequisites



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Anatomy
Zoology

Prerequisites for further study

The study of this course is fundamental for the topics which will be addressed in later years and in particular for the study of Bacterial, Viral and Parasitic infectious Diseases, Avian Pathology, Systematic Pathology, Food Inspection and Clinical disciplines.

Teaching methods

Teaching methods

MODULE 1: veterinary microbiology

LECTURES: 48 h frontal lessons by using slide projection

PRACTICAL TRAINING: 20 h

Topic _ microbiology, immunology

- Seminars: 0 hs
- Supervised self learning: 0 hs
- (Laboratory and desk-based work: 20 hs
- Non clinical animal work: 0 hs
- Clinical animal work intramural: 0 hs
- Clinical animal work extramural: 0 hs
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MODULE 2: veterinari parasitology

LESSONS: 48 frontal lessons by using slide projection

PRACTICAL TRAINING: 20 h

Topic _ parasitology

- Seminars: 0 hs
- Supervised self learning: 0 hs
- (Laboratory and desk-based work: 18 hs
- Non clinical animal work: 2 hs
- Clinical animal work intramural: 0 hs
- Clinical animal work extramural: 0 hs
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Syllabus

Module 1: Veterinary microbiology

LECTURES: 48 h frontal lessons (general bacteriology 18 hs, general virology 10 hs, immunology 20 hs).

GENERAL BACTERIOLOGY - 18 hs

(4:00 h) General about bacteria. Morphology of bacteria and bacterial cell function. Surface structures. Bacterial appendices. Intracytoplasmic structures. Bacterial spores.

(3:00 h) Factors affecting bacterial growth. Bacterial reproduction.

(4:00 h) Pathogenic action of bacteria: adhesiveness, invasiveness, virulence factors, toxins.

(5:00 h) Bacterial genetic. Transfer of genetic material to bacteria.

(2:00 h) Common sterilization and disinfection techniques.

GENERAL VIROLOGY - 10 hs

(2:00 h) Generality and characteristics of viruses: structure, size, chemical composition.

(2:00 h) Viral Replication and phases of viral infection.

(2:00 h) Types of viral infections.

(2:00 h) Viral interference. The bacteriophages.

(2:00 h) Classification of viruses: characteristics used in taxonomic constructions.

IMMUNOLOGY - 20 hs

(4:00 h) Naive or natural immunity. Acquired immunity: primary and secondary lymphatic organs

(2:00 h) Immune system cells

(2:00 h) Immunogens, antigens, haptens

(2:00 h) Structure and characteristic of immunoglobulins. Antibody classes and their biological properties

(2:00 h) Major histocompatibility complex (MHC)

(2:00 h) Complement system. Humoral immunity and mediated cell immunity



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(1:00 h) Primary and secondary immune response

(5:00 h) Active and passive immunity. Vaccines, adjuvants.

PRACTICAL TRAINING: 20 hs (in laboratory, groups)

(10:00 h) Preparation of cultures. Cultivation techniques. Observation and study of microorganisms by microscope: preparation of stained preparations for bacteriological examination. Bacterial identification techniques. Bacterial count. Evaluation of bacterial sensitivity to antibiotics: Antibigram, MIC

(5:00 h) Cultivation of viruses in the laboratory, cell cultures; cytopathic effects of viruses. Viral titration

(5:00 h) Antigen- Antibody In Vitro Reactions. Agglutination and Precipitation. Complement fixation, Serum neutralization, Viral hemagglutination inhibition, Immunofluorescence, ELISA.

Veterinary parasitology

LESSONS: 48 hrs (micology 6 hs, trematodes 4 hs, cestodes e acanthocephala 9 hrs, entomology 6 hrs, nematodes 15 hrs, protozoa 8 hrs).

MICOLOGY – 6 hrs

(1:00 h) Taxonomy of fungi, reproduction

(5:00 h) Morphology of main pathogenic fungi (Dermatophytes: *Microsporum canis*, *Microsporum gypseum*, *Trichophyton mentagrophytes*, *Trichophyton verrucosum*, *Aspegilli*, *Penicilli*, Morphological characteristics of *Candida albicans*, non-albicans morphology, *Cryptococcus* spp morphology with particulars of *C. neoformans*; reference to *Nosema* spp and *Encephalitozoon*

TREMATODES– 4 hs

(2:00 h) Introduction to parasitology, host concept, vertebrate host, definitive host, host cyclic vector, intermediate host

(2:00 h) Morphology and biological cycle of Hepatic Fasciola, *Opisthorchis felinus*, *Paramphistomidae*, *Dicrocoelium dendriticum*, *Schistosoma bovis*

CESTODES E ACANTHOCEPHALA – 9 hs

(4:0 h) Morphology and biological cycle of cestodes belonging to the Taenidae family (*T. solium*, *T. saginata*, *T. hydatigena*, *Echinococcus granulosus*, *E. multilocularis*, *T. multiceps*, *T. pisiformis*)

(3:0 h) Morphology and biological cycle of cestodes belonging to the families Anoplocephalidae, Dilepididae, Hymenolepidae, Mesocestoididae

(2:0 h) Morphology and biological cycle of pseudophyllide cestodes (*Diphyllobothrium* spp, *Spirometra erinacei*) acanthocytes

(*Macracanthorhynchus hyrudinaceus*)

ENTOMOLOGY – 6 hs

(3:0 h) Morphology and biological cycle of mites (*Sarcoptes*, *Notoedres*, *Cnemidocoptes*, *Psoroptes*, *Chorioptes*, *Otodectes*, *Dermanyssus gallinae*) and ticks (*Ixodidae* and *Argasidae*)

(3:0 h) Morphology and biological cycle of flea insects, mallophores, anoplids, nematocernium ditterium (*Culex* spp, *Aedes* spp, *Phlebotomus* spp, *Culicoides* spp, *Simulium* spp) and myasthmatic brachies (*Hypoderma bovis*, *H. lineatum*, *Oestrus ovis*, *Gasterophilus* spp)

NEMATODES – 15 hs

(3:0 h) Morphology and biological cycle of ascarides (*Ascaris suum* and *A. lumbricoides*, *Parascaris equorum*, *Toxocara canis*, *Toxocara cati*, *Toxocara vitulorum*, *Ascaridia* spp, *Heterakis gallinarum*, *Anisakidae*)

(4:0 h) Morphology and biological cycle of intestinal strongyles (fam *Trichostrongylidae*, *Ancylostomatidae*, *Strongylus* genus, *Ciatostomidae*, *Chabertia* spp, *Oesophagostomum* spp)

(2:0 h)) Morphology and biological cycle of respiratory strongyles (*Dyctiocaulus* sp, *Protostrongylidae*, *Metastrongylus* sp, *Angiostrongylus vasorum*, *Aelurostrongylus* and *Troglostrongylus* sp)

(1:0 h) Morphology and biological cycle of carnivores filariae (*Dirofilaria immitis*, *D. repens*)

(1:0 h)) Morphology and biological cycle of Strongyloides spp and spirurid (*Habronema*, *Draschia*, *Thelazia* and *Spirocerca*)

(4:0 h) Morphology and biological cycle of *Trichuris* sp, *Trichinella* (all species), *Capillaria* sp

PROTOZOA – 8 hs

(3:0 h) Morphology and biological cycle of Flagellate protozoa (*Trypanosoma equiperdum*, *Leishmania infantum*, *Giardia* spp, *Trichomonas* spp)

(5:0 h) Morphology and biological cycle of Apicomplexan protozoa (Sporozoa) (*Eimeria* spp, *Isospora* spp, *Cystoispora* spp, *Sarcocystis* spp, *Toxoplasma gondii*, *Neospora caninum*, *Babesia* spp, *Theileria* spp)

PRACTICAL TRAINING: 20 hs (laboratori, groups)

(2:00 h) Exercise I: fungi morphology

(2:00 h) Exercise II: trematodes morphology

(2:00 h) Exercise III: cestodes and acanthocephala morphology

(2:00 h) Exercise IV: mite and tick morphology

(2:00 h) Exercise V: insect morphology

(2:00 h) Exercise VI: intestinal nematodes morphology

(2:00 h) Exercise VII: extra-intestinal nematodes morphology

(2,00 h) Exercise VIII: Flagellate Protozoa

(2,00 h) Exercise IX: Sporozoan Protozoa

(2,00 h) Exercise X: Identification of parasite stages in elective body sites

Bibliography

Giorgio Poli. Microbiologia e immunologia veterinaria. Editore: [Edra](#). Edizione: 3, marzo 2017

Urquart et al., [Parassitologia](#) veterinaria (UTET) 1998

Chermette e Bussieras Parasitologie vétérinaire – fascicule V- Service de Parasitologie, Ecole Nationale Vétérinaire d'Alfort 1993

Taylor MA, Coop RL, Wall RL [Parassitologia](#) e Malattie Parassitarie degli Animali Domestici (EMSI), 2010



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[Non-attending students info](#)

The attendance at the course is mandatory, attested by recruiting signatures in the classroom. In a case of a working student or other specific problems, exemptions may be required.

[Work placement](#)

none

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