

28420 - Pharmacology and Drug Therapy

Syllabus Information

Academic year: 2023/24

Subject: 28420 - Pharmacology and Drug Therapy

Faculty / School: 105 - Facultad de Veterinaria

Degree: 451 - Degree in Veterinary Science

ECTS: 9.0

Year: 3

Semester: Annual

Subject type: Compulsory

Module:

1. General information

The main objective is for students to acquire the basic training that will enable them to use basic pharmaceuticals in the field of veterinary medicine, which in turn will be useful for the understanding and analysis of other disciplines of the Veterinary Degree.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement: Goal 3: Health and Wellness. Goal 4: Quality Education. Goal 5: Gender Equality.

2. Learning results

Upon completion of the subject, the student will be able to:

- 1: Interpret the meaning of the main pharmacokinetic parameters of the monocompartmental model.
- 2: Relate the evolution of drugs in the organism with their consequences on the effectiveness of a treatment.
- 3: Classify drugs according to their relationship with different receptors, and explain the interactions that can occur between them and their consequences.
- 4: Recognize the adverse reactions that drugs can produce, evaluate them and, if necessary, propose measures to reduce them.
- 5: Differentiate the pharmaceutical forms of presentation of a drug and choose the most appropriate according to the desired effects.
- 6: Know the pharmacological and therapeutic bases of drugs with action on microorganisms; on the central and peripheral nervous system; on the cardiovascular, respiratory, digestive and hormonal systems and on dermal processes.
- 7: Apply the general bases for the establishment of an adequate pharmacological treatment.
- 8: Calculate the amount of a drug to be administered to a patient to achieve the objective of a pharmacological treatment.
- 9: Select the best treatment for the resolution of a patient's health problem.
- 10: Know the regulations affecting the use of drugs in animals, and adapt their actions to them.

3. Syllabus

GENERAL PHARMACOLOGY.

Introduction to pharmacology. Concept of pharmacology. Subdivision and relationship with other disciplines. Objectives. Therapeutics.

Topic 2. Membrane transport of drugs. General principles. General mechanisms of transport across the cell membrane. Transport through intercellular clefts.

Topic 3. Pharmacokinetics I. Absorption and distribution. I Absorption mechanisms. Routes of administration. II Concept of distribution. Binding to plasma proteins. Blood-brain and placental barriers. Distribution modifying factors. Distribution volume.

Topic 4. Pharmacokinetics II. Drug metabolism. Pharmacological significance of metabolism. Sites of metabolic transformation of drugs. Metabolic pathways: synthetic and non-synthetic. Modification of biotransformation processes: physiological, pathological and pharmacological factors.

Topic 5. Pharmacokinetics III. Drug disposal. General mechanisms of drug elimination and factors that modify them. Renal elimination. Biliary elimination. Other routes of elimination.

Topic 6. Pharmacokinetics IV. Basic description of compartmental analysis. Concepts of the most characteristic parameters.

Topic 7. Mechanism of action of drugs. Concept of pharmacodynamics. Concept of receiver. Drug-receptor interaction. Affinity, intrinsic activity and potency of a drug. Dose-effect curves. Agonist and antagonist.

Topic 8. Pharmacological interactions. Concept. Modifications induced by pharmacological interactions. Concept of synergy and antagonism. Pharmacokinetic and pharmacodynamic interactions.

Topic 9. Undesirable effects of drugs. General aspects of drug toxicity: iatrogenic pathology. Classification of undesirable effects according to their origin: overdosage, side effects, idiosyncrasy, sensitization, resistance, tolerance.

Topic 10. Introduction to gene therapy. Types of gene therapy. Transformation modes. Guidelines for action. Gene transfer methods. Current status of gene therapy. Outlook.

Topic 11. Pharmacy. General concepts. Types of drugs. Techno-pharmaceutical operations: Spraying, sieving, powder mixing, dispersed systems. Pharmaceutical forms: For oral, parenteral, topical administration, others. Presentation of pharmaceutical forms. Criteria for the selection of a dosage form: Bioavailability and bioequivalence.

PHARMACOLOGY OF INFECTIOUS AND PARASITIC PROCESSES.

Topic 12. Introduction. General concepts. Potential targets of chemotherapeutic agents and mechanisms of action. Bacterial resistance. Antimicrobial associations. Toxicity and undesirable effects of antimicrobials. Use of chemotherapeutics.

Topic 13. Antiseptics and disinfectants. General aspects. Classification. Main pharmacological characteristics of the most commonly used antiseptics: Alcohols, phenols, detergents, oxidizing compounds, chlorhexidine.

NOTE: Each of the following topics will include for each group the study of: Chemical structure, classification, mechanism of action, spectrum of activity, resistance, pharmacokinetics, toxicity and undesirable effects, interactions and indications (topics 14-21).

Topic 14. Sulfonamides and diaminopyridines.

Topic 15. Antimicrobial drugs that affect bacterial wall synthesis. I. Beta-lactam antibiotics:

Penicillins, cephalosporins, monobactams, carbapenems, cephalosporin inhibitors, monoclonal beta-lactamases. II. Others: Vancomycin, Bacitracin.

Topic 16. Antimicrobial drugs that affect bacterial protein synthesis. I. Aminoglycosides. II. Tetracyclines. III. Phenicols. IV. Macrolides. V. Lincosamides.

Topic 17. Antimicrobial drugs that inhibit nucleic acid function. I. Quinolones. II. Nitrofurans. III. Nitroimidazoles. IV. Rifamycins.

Topic 18. Other antibacterial drugs. Polymyxins, Novobiocin.

Topic 19. Antifungal drugs. I. Antifungals for topical use. II. Antifungals for systemic use.

Topic 20. Anthelmintic drugs. I. Anthelmintics active against Nematodes. II. Anthelmintics active against Cestodes. III. Anthelmintics active against Trematodes.

Item 21. Drugs active against Coccidia.

PHARMACOLOGY OF THE NERVOUS SYSTEM.

Item 22. Autonomic Nervous System: anatomo-physiological basis. Concept of neurotransmitter. Adrenergic and cholinergic neurotransmission. Classification of drugs acting on the Autonomic Nervous System.

Topic 23. Adrenergic pharmacology: sympathomimetics and sympatholytics. Concept and classification. Mechanisms of action, pharmacological properties, toxicity, therapeutic applications.

Topic 24. Cholinergic Pharmacology. General basis. Mechanisms of action. Pharmacological properties

Topic 25. Autacoids: Histamine and antihistamines: mechanism of action, pharmacological properties, toxicity, therapeutic applications. Other Autacoids: general concepts.

Topic 26. Drugs acting on the Central Nervous System: Stimulant drugs: analeptics. Classification. Mechanism of action, pharmacological properties and therapeutic applications.

Topic 27. Non-narcotic analgesics: Study of the main pharmacological groups. Mechanism of action, pharmacological properties and therapeutic applications.

Topic 28. Narcotic analgesics. Basic pharmacological groups. Mechanism of action, pharmacological properties and therapeutic applications.

Topic 29. Local anesthetics: concept and classification. Mechanism of action, pharmacological properties and applications. Ways to achieve local anesthesia. General aspects.

Topic 30. Neuroleptic drugs. Most important pharmacological groups. Pharmacological characteristics and therapeutic applications.

Topic 31. General inhalation anesthetics. Periods of general anesthesia. Inhalation anesthetics. Pharmacological properties, toxicity, applications. Preanesthetic medication. NLA medication concept

Topic 32. Parenteral general anesthetics. Barbiturates, dissociative anesthetics, steroid agents and others. Pharmacological properties, toxicity, therapeutic applications.

PHARMACOLOGY OF ORGANS AND SYSTEMS

Topic 33. Cardiac pharmacology: cardiac tonics. Classification. Mechanism of action, pharmacological actions, toxicity, therapeutic applications. Antiarrhythmic drugs: pharmacological properties. Therapeutics of congestive heart failure.

Topic 34. Vascular modifying drugs: vasodilators and vasoconstrictors. Mechanism of action, pharmacological properties, therapeutic applications.

Topic 35. Blood pharmacology: hemostatic and anticoagulant drugs. Classification. Mechanism of action, pharmacological properties, applications. Anti-anemia medication.

Topic 36. Fluid therapy: hydro-electrolytic imbalance therapy. Oral and parental solutions. Blood replacements. Applications. Shock therapy.

Topic 37. Diuretics: concept. Classification. Place of action. Pharmacological properties, toxicity, therapeutic applications.

Topic 38. Pharmacology of the respiratory tract: cough sedatives, mucolytics and bronchodilators. Classification. Mechanism of action, pharmacological properties, toxicity, therapeutic applications. General aspects of the pharmacology of respiration.

Topic 39. Gastric pharmacology: appetite stimulants and anorectic agents. Stimulant and inhibitor drugs of secretions and motility. Antacids. Emetics and antiemetics

Item 40. Intestinal pharmacology: Laxatives and purgatives. Modulators of intestinal activity. Protectors, adsorbents and astringents. Classification. Mechanism of action, pharmacological properties, therapeutic applications. Therapeutics of enteric processes and colic.

Topic 41. Drugs acting on the reproductive system: steroid hormones. Gonadotropins. Prostaglandins. Oxytocic drugs and uterine relaxants.

Topic 42. Hormones that influence metabolism: thyroid. Parathyroid. Pancreatic. Classification. Mechanism of action, therapeutic applications.

Topic 43. Corticosteroids: classification. Pharmacology of cortisol. Short-, intermediate- and long-acting corticosteroids. Pharmacological actions. Clinical uses. Corticosteroid therapy.

Topic 44. Pharmacology and therapeutics of the skin: topical medication: Protective, irritant, antipruritic. Antimicrobial agents for topical use.

2: PRACTICAL LABORATORY CLASSES AND SEMINARS

A- Laboratory

Routes of administration and dosage of drugs.

Pharmacokinetics and dosage forms.

Pharmacodynamics. In vitro methods I.

Pharmacodynamics. In vitro methods II.

B.- Special therapeutic practices

Regime: Face-to-face and personalized tutoring.

C.- Seminars

1.

1. Fluid therapy

2. Pain and corticosteroids

3. Cardiovascular

Diabetes and other endocrine diseases.

4. Academic activities

90 classroom hours:

THEORETICAL CLASSES: 60 hours

PRACTICAL LABORATORY CLASSES: 16 hours

SEMINARS: 4 hours

SPECIAL THERAPEUTIC PRACTICES: 8 hours

SUPERVISED WORK: 2 hours

135 hours of non-classroom personal work, including hours of study and presentation of work.

5. Assessment system

Assessment activities:

The student must demonstrate that they have achieved the expected learning results through the following assessment activities:

1: Evaluation of the knowledge acquired with respect to the theoretical teaching, which includes the knowledge acquired in the theoretical classes.

There will be two written tests (first and second midterm exams), the first one corresponding to the section of General Pharmacology and Pharmacology of Infectious and Parasitic Processes, and the second one corresponding to the section of Nervous System and Organs and Systems.

Both tests will consist of 50 test questions, with four alternatives and only one correct option, graded as 1 point for each question answered correctly, 0.33 negative points for each question answered incorrectly and 0 points for each question not answered. Passing these tests will accredit the achievement of learning results 1 to 10 and globally represent 70% of the final grade.

2: Assessment of the practical laboratory sessions. Continuous assessment

During the week following the completion of the laboratory practices, students will be able to perform an evaluation activity of the knowledge acquired in them through Moodle-ADD (Anillo Digital Docente). The activity will be individual, and will consist of solving problems of dosage calculation, issuance of prescriptions and short questions in relation to the tasks performed in the laboratory practices. The completion of this activity will allow the student to achieve a maximum of 10 points in total (10% of the final grade).

Students who do not wish to undergo the continuous evaluation may take a final written test to evaluate the knowledge acquired in all the practical sessions. This exam will be held on the date established for the official calls of the subject and will consist of the resolution of problems and four-alternative multiple-choice questions with only one correct option, graded as 1 point for a question answered correctly, 0.33 negative points for a question answered incorrectly and 0 points for a question not answered. This exam will allow the student to achieve a maximum of 10 points in total (10% of the final grade).

Passing these tests accredits the achievement of learning results 1, 2, 3, 5 and 8, and of cross-cutting competency 4.

3: The evaluation of the special therapeutic practices will be carried out through the report submitted

by each work team and the continuous assessment of the tutor teacher assigned to each group. The grade for this practice is 20 points (20% of the final grade) and accredits the achievement of learning results 1, 2, 3, 5 and 8, and cross-cutting competency 4.

4: The assessment tests, first and second midterm exams, will take place on the dates indicated in the exam calendar prepared by the centre.

5: Overall test

Students who do not attend neither classes nor practices (laboratory and seminars) will be able to take a final exam, with multiple-choice questions, which will include the entire syllabus (theory, practices and other training activities). The exam will be written and will consist of 130 multiple-choice questions with only one correct option. The grading of the questions will be 1 point for a question answered correctly, 0.33 negative points for a question answered incorrectly and 0 points for a question not answered.

Assessment criteria and levels of demand 1: Continuous assessment:

The student's final grade will be obtained from the weighted sum of three parts.

THEORY

It accounts for 70% of the student's final grade.

It will be graded in two separate examinations, each consisting of 50 questions, worth 1 point per question. The first will correspond to the General Pharmacology and Chemotherapy sections (to be held in February) and the second to the Organs and Systems section (to be held in June).

These exams are considered computable when a minimum grade of 25 points is obtained in each one of them, otherwise no grade will be awarded, and must be repeated until this grade is reached in subsequent exams.

A student with 100 points out of 100 would thus get 7 points for their final grade. The minimum required (50 points out of 100) would mean 3.5 points for their final grade.

THERAPEUTIC PRACTICES

It corresponds to 20% of the student's final grade.

They will be carried out during the second four-month period and will be graded globally out of 20 points. The tutor teacher of each group will be in charge of assessing the report presented at the end of the practices according to the criteria set forth in the Teaching Guide. A minimum of 10 points will be required to pass this section.

PRACTICES AND SEMINARS

It accounts for 10% of the student's final grade.

It will consist of an exam graded out of 10 points to be taken online in the MOODLE-ADD application, or on the dates established for the official calls of the subject.

Following these criteria, a student's final grade will be obtained by applying the following equation: $\text{FINAL GRADE} = (0.7 \times \text{THEORY}) + (0.2 \times \text{PRACT. TERAP.}) + (0.1 \times \text{PRACT. LAB})$

The grades obtained will be valid for the entire academic year.

2: Global assessment

The overall examination will be graded out of 130 points, and will be passed with a minimum grade of 87 points.

3: Grading system:

As a consequence of the entry into force of RD. 1125/2003 of September 5, 2003, which establishes the European credit system and the grading system for university degrees, the student's grade will be double, both numerical and qualitative.

0-4,9: Fail (SS).

5,0-6,9: Pass (AP).

7,0-8,9: Notable (NT).

9,0-10: Outstanding (SB).

In application of article 158 of the Statutes of the University of Zaragoza, the provisional grades of the exams will be publicly exhibited for a minimum of 7 days, and students will be able to review their exams, for which the place, date and schedule foreseen for this purpose will be indicated in due time.