PHARMACOLOGY I

Study program	Veterinary Medicine
Year of study	III
Semester	I
Regime of discipline	DOB
Category	Dsf
Number of lectures hours per week	2
Number of seminar/laboratory/project hours per week	2
Total number of hours according to the curriculum: lectures/seminars/laboratory/project	28/28
Number of transferable credits	5

SPECIFIC SKILLS

Professional Competence	In line with the requirements of other recognized Curricula (EAEVE) in the EU, the discipline focuses on the formation of professional skills related to the knowledge of the basic criteria for establishing efficacy (pharmacokinetic and pharmacodynamic), toxicity of drug groups (incompatibilities, side and adverse reactions), validity and shelf life of veterinary medicinal products. Based on knowledge of the ATC classification of auv drugs, the aim is to know their action, characteristics, possible associations, their withdrawal period for human consumption, identification of the phenomenon of resistance, knowledge of the notions of drug residue and Maximum Admissible Daily Dose, etc. The aim is to train and develop skills for the implementation of appropriate therapy schemes for livestock and companion animals. These skills will be complemented by learning and using the basic concepts in calculating doses and concentrations of drugs as well as the correct and responsible prescription of the most appropriate remedy for animals, with individualizing treatment for cases / groups of animals (knowledge of the concepts of OTC - Over the Counter and Extra Label and their application in the Veterinarian - Client - Patient (VCP) relationship as well as the main EU drug directives, etc.

LEARNING OUTCOMES

Knowledge	Principles of pharmacokinetics and pharmacodynamics of veterinary drugs, toxicity, indications/contraindications, principles of administration of auv drugs
Skills	Applying an informed treatment, correctly calculating doses, concentrations, microquantities, dose extrapolations, etc.
Responsibility and autonomy	Rational choice, and informed administration, of the most appropriate (effective) / safe remedy usable in current veterinary casuistry.

COURSE OBJECTIVES

General objective of the course	The main general objective is to help students understand the principles of pharmacokinetics and pharmacodynamics of veterinary drugs, which will enable them to rationally and knowingly choose the most appropriate (effective) / safe remedy usable in current veterinary casuistry. The study of the discipline in the third year of schooling makes the natural transition to the group of clinical disciplines, for this reason, pharmacology can be considered as a fundamental turning point towards them. It also aims to capitalize on the notions accumulated in the first two years of schooling and to make logical, correct and effective connections, for the benefit of the clinical group that follows the third year.
Specific objectives	It is expected to prepare students for efficient and competent clinical activity, complemented with increased skills in terms of: knowledge, choice and judicious application of the most appropriate therapy and medication (from an ever-growing group of pharmaceutical preparations), knowledge and understanding of the phenomena that occur with the administration of active substances in the animal body: their circulation, remanence and potential for danger in the body; monitoring the healing state, following treatments and the ability to intervene appropriately with treatment, in the various clinical situations that arise. The goal is achieved by mastering the concepts of general pharmacology (or the basics of pharmacology) in Semester I, where the pharmacokinetics and pharmacodynamics of drugs are studied in detail by accumulating

	information about the invasion and evasion phase of drugs: routes of administration and drug absorption and coupling with plasma proteins, diffusion, metabolism, elimination, as well as the theoretical and practical elements of veterinary therapeutics, pharmacovigilance, euthanasia and through those of special pharmacology (main therapeutic groups), where essential notions are accumulated about: drug classification, main groups of drugs or drugs, with therapeutic recommendations specific to each preparation, spectrum, associations, waiting period (prohibition), kinetics, action, drug incompatibilities, adverse / secondary phenomena, resistance, etc.).

COURSE CONTENT

LECTURES	Number of hours
Topic no. 1 Introduction. The object and history of pharmacology. Branches of pharmacology. The notions of medicine, food, toxic, drug, remedy, medication. Pharmacopoeia. Achievements and directions in the foreign and domestic drug industry. Scientific research of medicinal substances.	**2**
Topic no. 2 Routes of administration and absorption of drugs in the body. Body-environment processes. Routes: oral, respiratory, cutaneous, intravenous, intramuscular, subcutaneous, etc. administration via rectal, vaginal and intramammary routes.	**2**
Topic no. 3 Drug transport in the blood. Factors influencing transport (structure, binding for transport, globulins, lipoproteins, gammaglobulins). Drug diffusion. Histo-morphological characteristics. Physico-chemical factors involved in distribution. Protein binding. Diffusion in water spaces. pH, pK relationshipAand diffusion of drugs.	**2**
Topic no. 4 Distribution of drugs in tissues. Mechanisms of diffusion. Passage through barriers (blood-brain, blood-ophthalmic, placental, cutaneous). Redistribution of drugs. Consequences of uneven distribution of drugs	**2**
Topic no. 5 Binding of drugs to receptors. Receptor theory. Receptor activity and characterization. Mode of action and nature of receptors. Isolation and identification of receptors. Agonists. Antagonists. Secondary messengers	**2**
Topic no. 6 Quantification of the coupling response. Theories (Clark's occupancy theory, Ariens' theory, Stephenson's theory, Paton's theory, "activation theory", enzymological theories.	**2**
Topic no. 7 Drug metabolism. Factors influencing metabolism. Physiological factors (renal blood flow, urinary pH, plasma protein binding, enzymatic factors). Animal-related factors (species, individuality, age, sex, gestation, nutrition, health status, genetic factors). Exogenous factors (circadian rhythm, exogenous chemical compounds, stress factors).	**2**
Topic no. 8 Biotransformation of drugs. microsomal, non-microsomal, biotransformations under the action of the microflora of the digestive tract, drug conjugation, acetylation, methylation, sulfoconjugation, glucuronoconjugation, peptide conjugation, mercaptation	**2**
Topic no. 9 Elimination of drugs and their accumulation in the body. Elimination via: renal, digestive, biliary, respiratory, skin, mammary gland, eggs	**2**
Topic no. 10 Elements of pharmacokinetics Disposal kinetics. Pharmacokinetic models: monocompartmental, bicompartmental, tricompartmental. Bateman's function.	**2**
Topic no. 11 Factors influencing the effect of drugs. Species, age, individual characteristics, type of nervous activity, pathological condition, route of administration, pharmaceutical form. Influence of the therapeutic effect by: the amount of drug. Factors determining the dosage. Concomitant drug therapy. Factors determining the frequency of administration. Stereospecificity of drug action. Zero-order kinetics. Drug residues. Risk-benefit ratios.	**2**
Topic no. 12 Changes produced in the body under the influence of drugs. General and local action. Direct, indirect, reflex, main, secondary, etiotropic action. Symptomatic therapy.	**2**

Correlation chemical structure – pharmacodynamic action.	
Topic no. 13 Dose-effect relationship. Latency and intensity. Duration of action of a drug. Biopharmaceutical factors and therapeutic effect. Statistical methods frequently used in effect pharmacometry.	**2**
Topic no. 14 Drug combinations. Phenomena that can be observed following repeated administration or drug association: cumulation, habituation, synergism, potentiation, antagonism. Antidotism. Side effects (unwanted). Therapeutic or toxic action of drugs at the time and place of administration. Incompatibilities.	**2**
Total	**28**

SEMINAR/LABORATORY	Number of hours
Topic no. 1 Presentation of the pharmacology laboratory. Romanian, European and USP pharmacopoeia. Veterinary drugs, classifications by conditioning groups, EU legislation regarding the testing of new drugs.	2
Topic no. 2 /3 Common calculations in pharmacology. Dose and concentration calculations,	4
Topic no. 4 /5 Common calculations in pharmacology.Solvent requirement calculation, recipe reduction or multiplication calculation	4
Topic no. 6 Common calculations in pharmacology.Calculation of dilutions, microquantities and concentrations of drugs in the blood and body, AS units of measurement	2
Topic no. 7 /8 Common calculations in pharmacology.Calculations for extrapolating drug doses from human medicine to veterinary medicine (calculation according to the Losher and Löwe formulas, according to metabolic weight and body surface area).	4
Topic no. 9 /10 Pharmacography. The object and importance of the study. The way of writing prescriptions, according to the legislation. Common abbreviations. Prescription with a dry stamp. Preparation of the prescription file. Other indications related to the issuance of prescriptions, related legislation, the issuance of prescriptions in the EU and the USA. Categories and examples of prescriptions by groups of conditions.	4
Topic no. 11 /12 Drug incompatibilities.Physical, chemical and pharmacological incompatibilities / Drug interactions. Pharmacokinetics and pharmacodynamics	4
Topic no. 13 Drug combinations.Synergistic, indifferent, attenuating, antagonistic associations / Adverse drug reactions. Toxic, idiosyncratic, drug allergy, mutagenic-teratogenic, carcinogenic, tolerance and addiction types.	2
Topic no. 14 Lab exam	2
Total	28

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ASSESSMENT

Activity type	Assessment criteria	Assessment methods	Percentage of final grade
Lectures	Course Examination	Written / oral at the students' choice: students receive two topics / exam ticket or Quiz with 45 questions	**55**
	Partial participation (in writing / Semester)	(written test in the 7th week, at the request of the students)	**10**
Seminar/laboratory/clinical sessions	Active participation in the LP (oral/Semester)	Interaction, debate	**10**
	LP/Semester Examination	Lab exam (written) (prescription and solving a therapeutic calculation)	**20**
Projects/papers	Bibliographical reports / Semester	PowerPoint presentation	**5**

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