

# Postgraduate Diploma

## Systemic Veterinary Pharmacology





## Postgraduate Diploma Systemic Veterinary Pharmacology

- » Modality: online
- » Duration: 6 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/in/pharmacy/postgraduate-diploma/postgraduate-diploma-systemic-veterinary-pharmacology](http://www.techtitute.com/in/pharmacy/postgraduate-diploma/postgraduate-diploma-systemic-veterinary-pharmacology)

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# 01

# Introduction

Given the large number of functions and organs that are controlled by the autonomic nervous system and the relatively small number of different receptors that mediate cholinergic and adrenergic transmission, it is difficult to ensure that drugs that interfere with these neurotransmitter systems achieve the necessary selectivity (absence of side effects) to be able to make broad therapeutic use of them. However, many of them are valuable tools in pharmacological research that have found some clinical utility by acting in three ways: by modifying the availability of the transmitter in the extracellular space, by acting on the presynaptic element and by acting at the postsynaptic level. This is essential training for the professional who wants to specialize in Systemic Veterinary Pharmacology.







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*Advance your skills and keep up to date with all the latest developments in pharmacological approaches in this particular area of use”*

This specialization will lead the student to the most complete learning of the main pharmacological properties of the groups of drugs capable of modifying body functions that interfere with their autonomic regulation. For this purpose, the main pharmacological properties, mechanisms of action, pharmacokinetics, and therapeutic and toxic effects of the groups of drugs that act on the central nervous system and other systems of the animal organism are determined in this training.

Due to their complexity, the mechanisms by which various drugs act on the Central Nervous System are not always well understood. These drugs with effects on the Central Nervous System act on specific receptors that regulate synaptic transmission.

This Postgraduate Diploma examines the main pharmacological properties (mechanism of action, pharmacokinetics, and therapeutic and toxic effects) of groups of drugs that act on the cardiovascular, respiratory, renal and blood systems. Classifies the different drugs that act at the vascular level, such as coagulation modifiers, and cardiac drugs. It examines the different drugs that act as respiratory stimulants, bronchodilators, expectorants and antitussives. It also deals with the pharmacology of the digestive system, both at the level of secretion and motility, laxative and antidiarrheal drugs, as well as pharmacology of vomiting. Finally, it establishes the drugs used for the treatment of a wide variety of neurological and psychiatric diseases, analgesics, among other symptoms; and offers specialized knowledge on the different drugs that act on the motility of the stomach and its secretions, as well as drugs that act on the gastric pH, on the intestinal tract and on the motility of the rumen-reticulum.

The program includes practical activities to facilitate students' acquisition and mastery of the theory learned, supporting and complementing the knowledge acquired in the theoretical teaching. The contents are presented to the professional in an attractive and dynamic way in multimedia packages that include videos, images and diagrams in order to reinforce knowledge.

Thanks to its innovative teaching methodology, it allows the student to follow its contents in a totally flexible and personalized way, with great availability on the part of the teachers for consultations, doubts or tutorials.

This **Postgraduate Diploma in Systemic Veterinary Pharmacology** contains the most complete and up-to-date scientific program on the market. The most important features of the program include:

- ♦ Practical cases presented by experts in Veterinary Pharmacology
- ♦ The graphic, schematic, and eminently practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ♦ Practical exercises where self-assessment can be used to improve learning.
- ♦ Its special emphasis on innovative methodologies
- ♦ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ♦ Content that is accessible from any fixed or portable device with an Internet connection



*Improving your skills in a sector with a high demand for professionals will boost both your professional and personal career”*

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*Succeed with the best and acquire the knowledge and skills you need to embark on the veterinary pharmacology industry”*

The program’s teaching staff includes professionals from sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive training programmed to train in real situations.

This program is designed around Problem Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the student will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Get up to date on the use of systemic drugs in the veterinary field for the prevention and treatment of diseases affecting animal health.*

*Specialize in Systemic Veterinary Pharmacology through a revolutionary training for its teaching and content quality, and its intensive and flexible approach at the same time.*



# 02

# Objectives

The program design of this program will allow the student to acquire the necessary competencies to update in the profession after studying in depth the key aspects of Veterinary Pharmacology. Its objective is to provide the student with the required competencies in relation to preclinical or clinical research of drugs used in veterinary medicine, and their application in the therapeutic use of drugs so that he/she can better incorporate into the professional field. The knowledge acquired in the development of the points of the syllabus will drive the professional from a global perspective, with full capacity to achieve the proposed goals.







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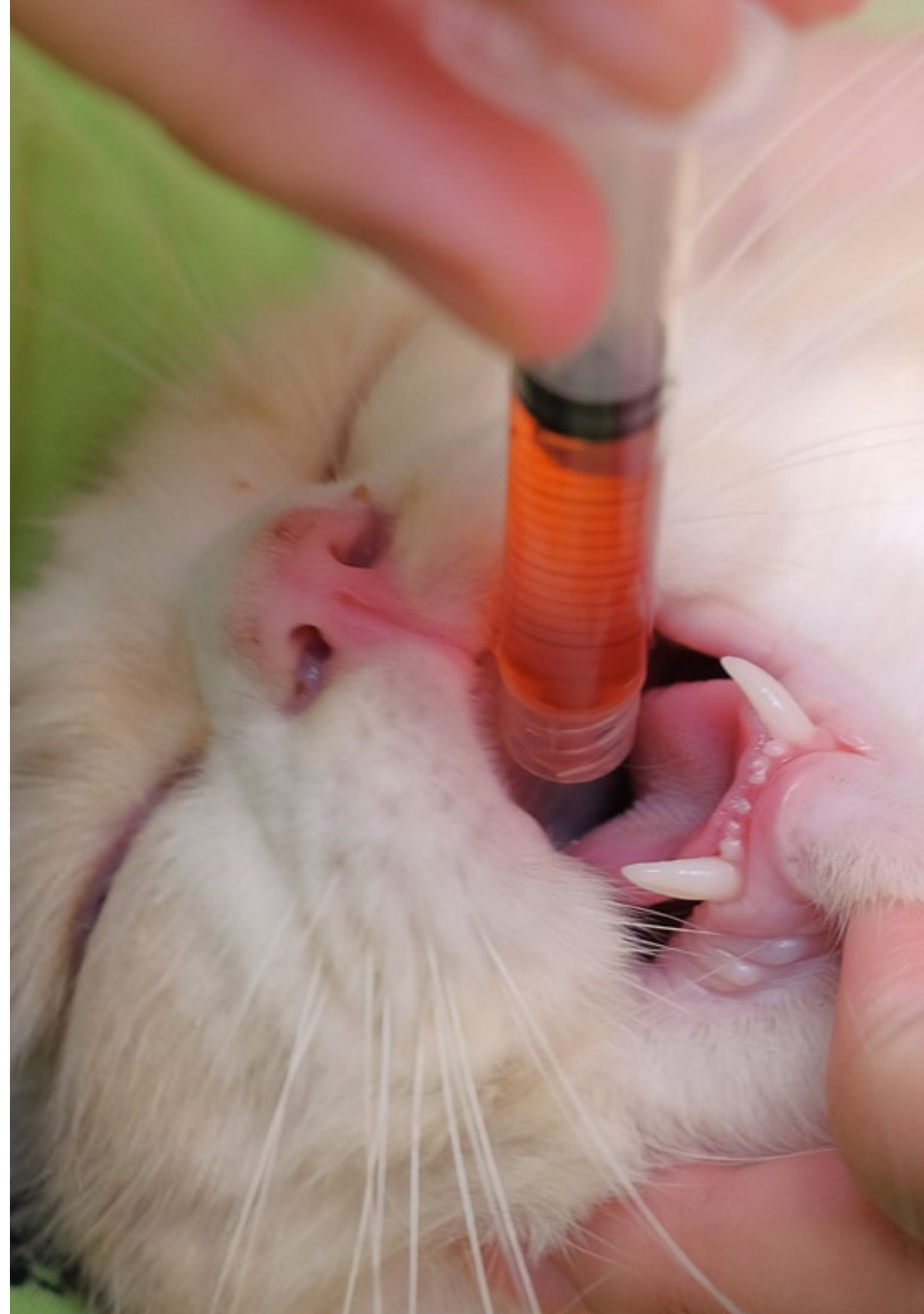
*A complete program that will lead you to the exhaustive training necessary to intervene as a specialist in the theoretical and practical aspects of Systemic Veterinary Pharmacology".*



## General Objectives

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- ♦ Differentiate the Autonomic Nervous System and its organization
- ♦ Identify the groups of drugs that act on the autonomic nervous system
- ♦ Recognize the mechanisms of action and therapeutic uses of this group of drugs
- ♦ Examine the main pharmacological properties of the groups of drugs acting on the central nervous system
- ♦ Identify the different pharmacological targets involved in CNS transmission
- ♦ Recognize the mechanisms of action, therapeutic and toxic uses of this group of drugs
- ♦ Examine the pharmacological basis of cardiorespiratory system therapy and homeostasis
- ♦ Identify the main therapeutic groups and their indications
- ♦ Determine the mechanisms of action of different drug groups, properties and pharmacokinetics
- ♦ Develop the student's critical and analytical skills through the resolution of clinical cases
- ♦ Determine the pharmacological basis of digestive tract therapy
- ♦ Identify the main therapeutic groups and their indications in veterinary medicine
- ♦ Examine different drug groups' mechanisms of action, properties and pharmacokinetics
- ♦ Develop the student's critical and analytical skills through the resolution of clinical cases





## Specific Objectives

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### Module 1. Pharmacology of the Autonomus Nervous System

- ◆ Establish the classification of drugs according to their structure, mechanism of action and pharmacological action acting on the Autonomus Nervous System
- ◆ Distinguish the chemical mediators and receptors that interact in the Autonomus Nervous System
- ◆ Determine the classification of drugs by their mechanism of action and pharmacological action acting on the Autonomus Nervous System
- ◆ Analyze the drugs that act at the level of cholinergic transmission in the Autonomus Nervous System by their structure, mechanism of action and route of administration.
- ◆ Examine drugs acting at the level of adrenergic transmission in the autonomic nervous system by their structure, mechanism of action and route of administration
- ◆ Determine the general effects of neuromuscular blocking agents on the peripheral nervous system by their mechanism of action and pharmacological action
- ◆ Solve problems and interpret results of pharmacological experiments associated with the organ bath technique
- ◆ Acquire the ability to search for and manage information related to the Autonomus Nervous System



### Module 2. Pharmacology of the Central Nervous System

- ♦ Establish the classification of drugs according to their structure, mechanism of action and pharmacological action acting on the Central Nervous System
- ♦ Always act with the objective of facilitating good health and quality of life for the animals, avoiding unnecessary suffering through the administration of different drugs
- ♦ Distinguish the chemical mediators and receptors that interact in pain
- ♦ Differentiate the classification of analgesic drugs by their mechanism of action and pharmacological action acting on the Central Nervous System
- ♦ Analyze the drugs that act at the level of anesthesia and sedation in the Central Nervous System by their structure, mechanism of action and route of administration
- ♦ Determine the general effects of stimulant drugs on the Central Nervous System and recognize their mechanism of action and pharmacological action
- ♦ Determine the general effects of depressant drugs on the Central Nervous System and recognize their mechanism of action and pharmacological action

### Module 3. Pharmacology of the Cardiovascular, Renal and Respiratory system. Hemostasis.

- ♦ Describe the mechanisms of action of drugs used to treat heart failure, hypertension or arrhythmias
- ♦ Examine antianemic drugs and growth factors, as well as mechanisms of action, adverse reactions and pharmacokinetics
- ♦ Determine the main routes of administration of drugs used in the cardiorespiratory system and homeostasis







- ◆ Present the drugs used against cough, mucolytics and expectorants and their mechanisms of action, adverse reactions, pharmacokinetics and side effects
- ◆ Solve problems and clinical cases related to the cardiorespiratory system
- ◆ Associate the correct drug to the main symptoms and pathologies of the cardiorespiratory system
- ◆ Safe and effective use of pharmaceuticals

#### **Module 4. Pharmacology of the Digestive System**

- ◆ Identify the most common routes of administration of each of the drugs and the forms of presentation of the same in veterinary medicine
- ◆ Examine drugs related to acid secretion: antisecretory, antacids and mucosal protectants, as well as their adverse effects, contraindications and pharmacokinetics
- ◆ Present drugs to improve gastrointestinal motility, their mechanisms of action, drug interactions and adverse reactions
- ◆ Describe the drugs used to treat vomiting
- ◆ Determine the pharmacology of the hepatobiliary and pancreatic systems, their mechanisms of action, interactions and pharmacokinetics
- ◆ Solve problems and clinical cases related to the digestive system
- ◆ Associate the correct drug to the main symptoms and pathologies of the digestive tract

03

# Course Management

The teaching team of this Postgraduate Diploma is made up of professionals specialized in the study of Pharmacology, both human and veterinary, with clinical experience in small and large animals. They have extensive and recognized teaching and research experience, with officially recognized six-year research periods, participation in numerous research projects and dissemination of their research both nationally and internationally in high impact journals, books and conferences.





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*A unique opportunity to learn from internationally renowned professors, with teaching, clinical and research experience"*

Management



**Dr. Santander Ballestín, Sonia**

- ♦ Associate Professor of the Department of Pharmacology and Physiology. University of Zaragoza
- ♦ Degree in Biology and Biochemistry, specializing in the area of Pharmacology
- ♦ Teaching Coordinator, Department of Pharmacology, University of Zaragoza, Spain
- ♦ PhD with the European Degree from the University of Zaragoza
- ♦ Master's Degree in Environment and Water Management. Andalusia Business School
- ♦ Lecturer in the Postgraduate Certificate "Introduction to Pharmacology: Principles for the Rational Use of Drugs" Basic Program of the University of Experience of Zaragoza
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- ♦ Lecturer in the Postgraduate Certificate "Introduction to Pharmacology: Principles for the Rational Use of Drugs" Basic Program of the University of Experience of Zaragoza
- ♦ Evaluation professor in objective structured clinical evaluation of the medical degree
- ♦ Lecturer in the Postgraduate Certificate "Introduction to Pharmacology: Principles for the Rational Use of Drugs" Basic Program of the University of Experience of Zaragoza



## Professors

### Ms. Lomba, Laura

- ♦ Professor of Pharmacokinetics at San Jorge University in the Degree in Pharmacy
- ♦ Licenciado en Ciencias Químicas por la Universidad de Zaragoza
- ♦ Ph.D. with European Mention in Pharmacy University of Zaragoza
- ♦ Graduate in Pharmacy University of Zaragoza
- ♦ Researcher in the field of Green Chemistry
- ♦ Professor of Biochemistry and Molecular Biology II at San Jorge University in the Degree in Pharmacy
- ♦ Professor of Biochemistry and Molecular Biology, Universidad San Jorge, Degree in Pharmacy
- ♦ Professor of Physicochemistry I at the Universidad San Jorge, degree in Pharmacy
- ♦ Professor of Pharmacology Applied to Physiotherapy, Universidad San Jorge, Physiotherapy degree
- ♦ Professor of Biopharmacy and Pharmacokinetics, Universidad San Jorge, Degree in Pharmacy
- ♦ Master's Degree in Environmental Management in Companies
- ♦ Research stay in the Department of Medicinal Chemistry at the Institute of Cancer Therapeutics, Cradford, UK

### Ms. Luesma Bartolomé, María José

- ♦ Veterinarian. Study Group on Prion Diseases, Vectorial Diseases and Emerging Zoonoses at the University of Zaragoza
- ♦ University Research Institute Study Group
- ♦ Film and anatomy teacher. University Degree: Complementary Academic Activities
- ♦ Professor of Anatomy and Histology University degree: Graduate in Optics and Optometry. University of Zaragoza

- ♦ Professor of Final Degree Project University Degree, Bachelor's Degree in Medicine
- ♦ Professor of Morphology. Development Biology University degree: Professional Master's Degree in Initiation to Research in Medicine. University of Zaragoza
- ♦ Doctor of Veterinary Medicine. Official Doctorate Program in Veterinary Sciences. University of Zaragoza
- ♦ Degree in Veterinary Medicine. University of Zaragoza

### Dr. Arribas Blázquez, Marina

- ♦ Bill & Melinda Gates Foundation: Post-doctoral teaching and research labor contract
- ♦ Degree in Biology from the University of Salamanca
- ♦ Doctorate in Neuroscience from the Complutense University of Madrid
- ♦ Institute of Biomedical Research: Alberto Sols Labor researcher and teacher
- ♦ Complutense University of Madrid: Post-doctoral teaching and research labor contract
- ♦ Complutense University of Madrid: Teaching and research labor contract
- ♦ Severo Ochoa Molecular Biology Center: Predoctoral teaching and research labor contract
- ♦ Complutense University of Madrid: Predoctoral teaching and research labor contract
- ♦ Bachelor's Degree in Biology Specialty: Fundamental Biology and Biotechnology
- ♦ Category B qualification in Protection of animals used for experimental and other scientific purposes
- ♦ Master in Neurosciences

# 04

# Structure and Content

The structure of this program has been designed in such a way that the professional to whom it is addressed will be able to identify and solve problems related to veterinary pharmacology, thanks to a unique methodology and the support of the experts who have developed it. This Postgraduate Diploma offers the student a realistic learning in the context of Veterinary Pharmacology, which makes it an extremely useful tool for the pharmaceutical professional. Through clinical simulations at a practical level, you will be able to face real situations and provide a broader and more effective response to them.





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*Acquire the most up-to-date knowledge of Systemic Veterinary Pharmacology and the skills and attitudes for its practical application in a training created for excellence”*



## Module 1. Pharmacology of the autonomic nervous system

- 1.1. Peripheral Nervous System
  - 1.1.1. Definition
  - 1.1.2. Classification
  - 1.1.3. Autonomous Nervous System
    - 1.1.3.1. Definition
    - 1.1.3.2. Classification
- 1.2. Cholinergic Neurotransmitter System
  - 1.2.1. Definition
  - 1.2.2. Nicotinic and Muscarinic Receptors
  - 1.2.3. Classification of Drugs
- 1.3. Pharmacology of Cholinergic Transmission I
  - 1.3.1. Transmission Blocking Drugs in Autonomous Ganglia
  - 1.3.2. Nicotinic Receptor Antagonists with Sympathokolic Effects
  - 1.3.3. Nicotinic Receptor Antagonists with Parasympatholytic Effects (hexamethonium, mecamlamine)
- 1.4. Pharmacology of Cholinergic Transmission II
  - 1.4.1. Transmission-Blocking Drugs at Neuroeffector Junctions
  - 1.4.2. Muscarinic Receptor Antagonists
  - 1.4.3. Parasympatholytic Effects (Atropine, Scopolamine)
- 1.5. Pharmacology of Cholinergic Transmission
  - 1.5.1. Drugs that Mimic the Effects of Acetylcholine on Neuroeffector Junctions
  - 1.5.2. Muscarinic Receptor Agonists
  - 1.5.3. Parasympathomimetic Effects (acetylcholine, methacholine, betanechol)
- 1.6. Adrenergic Neurotransmitter System
  - 1.6.1. Definition
  - 1.6.2. Adrenergic Receptors
  - 1.6.3. Classification of Drugs
- 1.7. Pharmacology of Adrenergic Transmission
  - 1.7.1. Drugs that Promote Noradrenaline at Neuroeffector Synapses
- 1.8. Pharmacology of Adrenergic Transmission





- 1.8.1. Transmission-Blocking Drugs at Neuroeffector Junctions
- 1.9. Pharmacology of Adrenergic Transmission
  - 1.9.1. Drugs that Mimic the Effects of Noradrenaline at Neuroeffector Junctions
- 1.10. Pharmacology in the Motor Plate
  - 1.10.1. Ganglionic or Ganglioplegic Blocking Drugs
  - 1.10.2. Non-Depolarizing Neuromuscular Blocking Drugs
  - 1.10.3. Depolarizing Neuromuscular Blocking Drugs

## Module 2. Pharmacology of the central nervous system

- 2.1. Pain
  - 2.1.1. Definition
  - 2.1.2. Classification
  - 2.1.3. Pain Neurobiology
    - 2.1.3.1. Transduction
    - 2.1.3.2. Transmission
    - 2.1.3.3. Modulation
    - 2.1.3.4. Perception
  - 2.1.4. Animal Models for the Study of Neuropathic Pain
- 2.2. Nociceptive Pain
  - 2.2.1. Neuropathic Pain
  - 2.2.2. Pathophysiology of Neuropathic Pain
- 2.3. Analgesic Drugs. Nonsteroidal Anti-Inflammatory Drugs
  - 2.3.1. Definition
  - 2.3.2. Pharmacokinetics
  - 2.3.3. Mechanism of Action
  - 2.3.4. Classification
  - 2.3.5. Pharmacological Effects
  - 2.3.6. Side Effects
- 2.4. Analgesic Drugs. Steroidal Anti-Inflammatory Drugs
  - 2.4.1. Definition
  - 2.4.2. Pharmacokinetics
  - 2.4.3. Mechanism of Action. Classification
  - 2.4.4. Pharmacological Effects
  - 2.4.5. Side Effects:
- 2.5. Analgesic Drugs. Opioids
  - 2.5.1. Definition
  - 2.5.2. Pharmacokinetics
  - 2.5.3. Mechanism of Action. Opioid Receptors
  - 2.5.4. Classification
  - 2.5.5. Pharmacological Effects
    - 2.5.5.1. Side Effects
- 2.6. Pharmacology of Anesthesia and Sedation
  - 2.6.1. Definition
  - 2.6.2. Mechanism of Action
  - 2.6.3. Classification: General and Local Anesthetics
  - 2.6.4. Pharmacological Properties
- 2.7. Local Anesthetic. Inhalation Anesthetics
  - 2.7.1. Definition
  - 2.7.2. Mechanism of Action
  - 2.7.3. Classification
  - 2.7.4. Pharmacological Properties
- 2.8. Non-Injectable Anesthetics
  - 2.8.1. Neuroleptoanesthesia and Euthanasia. Definition
  - 2.8.3. Mechanism of Action
  - 2.8.3. Classification
  - 2.8.4. Pharmacological Properties
- 2.9. Central Nervous System Stimulant Drugs
  - 2.9.1. Definition

- 2.9.2. Mechanism of Action
- 2.9.3. Classification
- 2.9.4. Pharmacological Properties
- 2.9.5. Side Effects
- 2.9.6. Antidepressants
- 2.10. Central Nervous System Depressant Drugs. and
  - 2.10.1. Definition
  - 2.10.2. Mechanism of Action
  - 2.10.3. Classification
  - 2.10.4. Pharmacological Properties
  - 2.10.5. Side Effects
  - 2.10.6. Anticonvulsants

### Module 3. Pharmacology of the Cardiovascular, Renal and Respiratory System. Hemostasis

- 3.1. Pharmacology of the Cardiovascular System I
  - 3.1.1. Positive Inotropic and Inodilator Drugs
  - 3.1.2. Sympathomimetic Amines
  - 3.1.3. Glycosides
- 3.2. Pharmacology of the Cardiovascular System II
  - 3.2.1. Diuretic Drugs
- 3.3. Pharmacology of the Cardiovascular System III
  - 3.3.1. Drugs Acting on the Renin-Angiotensin System
  - 3.3.2. Beta-Adrenergic Antagonist Drugs
- 3.4. Pharmacology of the Cardiovascular System IV
  - 3.4.1. Vasodilator Drugs
  - 3.4.2. Calcium Channel Antagonists
- 3.5. Pharmacology of the Cardiovascular System V
  - 3.5.1. Antiarrhythmic Drugs
- 3.6. Pharmacology of the Cardiovascular System VI
  - 3.6.1. Antianginal Drugs

- 3.6.2. Lipid-Lowering Drugs
- 3.7. Blood Pharmacology I
  - 3.7.1. Anti-Anemia Drugs
    - 3.7.1.1. Iron
    - 3.7.1.2. Folic Acid
    - 3.7.1.3. Vitamin B12
  - 3.7.2. Hematopoietic Growth Factors
    - 3.7.2.1. Erythropoietins
    - 3.7.2.2. Granulocyte Colony Stimulating Factors
- 3.8. Blood Pharmacology II
  - 3.8.1. Antithrombotic Drugs
  - 3.8.2. Anti-Aggregation Drugs
  - 3.8.3. Anticoagulants
  - 3.8.4. Fibrinolytic Drugs
- 3.9. Pharmacology of the Respiratory System I
  - 3.9.1. Antitussives
  - 3.9.2. Expectorants
  - 3.9.3. Mucolytics
- 3.10. Pharmacology of the Respiratory System II
  - 3.10.1. Bronchodilators (Methylxanthines, Sympathomimetics, Antimuscarinics)
  - 3.10.2. Anti-inflammatory Drugs used in Asthma
  - 3.10.3. Anti-inflammatory Drugs Used in Chronic Obstructive Pulmonary Disease (Corticosteroids, Mediator Release Inhibitors, Leukotriene Inhibitors)

### Module 4. Pharmacology of the digestive system

- .1. Pharmacology of Acid Secretion I

- 4.1.1. Physiology of Secretion and Main Alterations
- 4.1.2. Antisecretory agents
- 4.1.3. Proton Pump Inhibitors
- 4.1.4. Histamine H<sub>2</sub>-Receptor Antagonists
- 4.2. Pharmacology of Acid Secretion II. Antacids
  - 4.2.1. Magnesium Compounds
  - 4.2.2. Aluminium Compounds
  - 4.2.3. Calcium Carbonate
  - 4.2.4. Sodium Bicarbonate
- 4.3. Pharmacology of Acid Secretion III. Mucous Membrane Protectors.
  - 4.3.1. Sucralfate
  - 4.3.2. Bismuth Salts
  - 4.3.3. Prostaglandin Analogs
- 4.4. Pharmacology of Ruminants
  - 4.4.1. Biochemical Alterations of Drugs in the Rumen
  - 4.4.2. Effects of Drugs on Ruminal Microflora
  - 4.4.3. Drug Distribution in the Rumen-Reticulum
  - 4.4.4. Salivary Secretion of Drugs
  - 4.4.5. Agents Affecting Pre-stomach Functions
  - 4.4.6. Treatment of Meteorism, Tympanism, Ruminal Acidosis and Atonia.
- 4.5. Pharmacology of Intestinal Motility I
  - 4.5.1. Physiology of Motility and Main Alterations
  - 4.5.2. Prokinetic Drugs
- 4.6. Pharmacology of Intestinal Motility II
  - 4.6.1. Antidiarrheal Drugs
  - 4.6.2. Prebiotics, Probiotics and Flora
- 4.5.7. Pharmacology of Intestinal Motility III. Constipation
  - 4.7.1. Bolus-Forming Drugs

- 4.7.2. Lubricants and Emollients
- 4.7.3. Osmotic Laxatives
- 4.7.4. Stimulant Laxatives
- 4.7.5. Enemas.
- 4.8. Pharmacology of Vomiting
  - 4.8.1. Antiemetic and Emetic Drugs
  - 4.8.2. D<sub>2</sub> Dopaminergic Antagonists
  - 4.8.3. Antihistamines
  - 4.8.4. Muscarinic Antagonists
  - 4.8.5. Serotonergic Antagonists
- 4.9. Pharmacology of the Hepatobiliary and Pancreatic System
  - 4.9.1. Choloretic and Cholagogue Drugs
- 4.10. Pharmacology of Inflammatory Bowel Disease
  - 4.10.1. Corticoids
  - 4.10.2. Immunosuppressants
  - 4.10.3. Antibiotics
  - 4.10.4. Aminosalicylates



*It advances towards excellence  
with the help of the best  
professionals and teaching  
resources of the moment”.*

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# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.







*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will be confronted with multiple simulated clinical cases based on real patients, in which they will have to investigate, establish hypotheses and ultimately, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Pharmacists learn better, more quickly and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gérvas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, attempting to recreate the actual conditions in a pharmacist's professional practice.

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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method.*

The effectiveness of the method is justified by four fundamental achievements:

1. Pharmacists who follow this method not only grasp concepts, but also develop their mental capacity, by evaluating real situations and applying their knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the Harvard case method with the best 100% online teaching methodology available: Relearning.

Our University is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, which represent a real revolution with respect to simply studying and analyzing cases.



*Pharmacists will learn through real cases and by solving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 115,000 pharmacists have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. This pedagogical methodology is developed in a highly demanding environment, with a university student body with a high socioeconomic profile and an average age of 43.5 years.

*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



### Study Material

All teaching material is created specifically for the course by specialist pharmacists who will be teaching the course, so that the didactic development is highly specific and accurate.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



### Video Techniques and Procedures

TECH introduces students to the latest techniques, to the latest educational advances, to the forefront of current pharmaceutical care procedures. All of this, first hand, and explained and detailed with precision to contribute to assimilation and a better understanding. And best of all, you can watch them as many times as you want.



### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This unique multimedia content presentation training system was awarded by Microsoft as a "European Success Story".



### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, we will present you with real case developments in which the expert will guide you through focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



### Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



06

# Certificate

The Postgraduate Diploma in Systemic Veterinary Pharmacology guarantees you, in addition to the most rigorous and up-to-date training, access to a Postgraduate Diploma issued by TECH Technological University.





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*Successfully complete this training and receive your university degree without travel or laborious paperwork”*

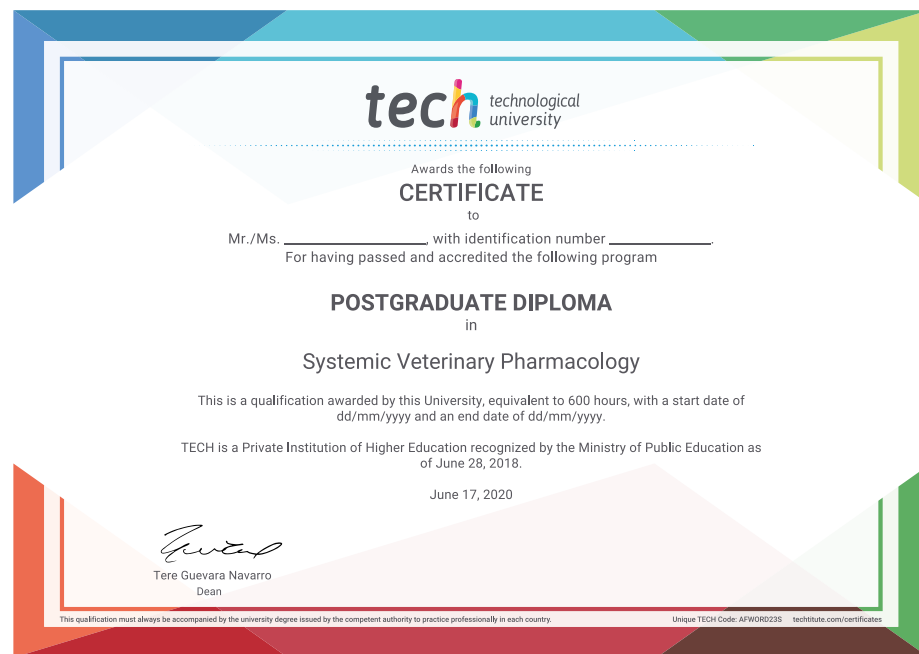
This **Postgraduate Diploma in Systemic Veterinary Pharmacology** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Postgraduate Diploma** issued by **TECH Technological University** via tracked delivery\*.

This degree contributes in a relevant way to the development of the continuing education of the professional and provides a high university curricular value to their training, and is 100% valid in all public examinations, professional career and labor exchanges of any Spanish Autonomous Community.

Title: **Postgraduate Diploma in Systemic Veterinary Pharmacology**

Official N° of Hours: **600 h.**



\*Apostille Convention. In the event that the student wishes to have their paper certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.

future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development language  
virtual classroom



**Postgraduate Diploma**  
Systemic Veterinary  
Pharmacology

- » Modality: **online**
- » Duration: **6 months**
- » Certificate: **TECH Technological University**
- » Dedication: **16h/week**
- » Schedule: **at your own pace**
- » Exams: **online**

# Postgraduate Diploma

## Systemic Veterinary Pharmacology

