

# Professional Master's Degree Veterinary Cardiology in Small Animals





## Professional Master's Degree Veterinary Cardiology in Small Animals

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtute.com/in/veterinary-medicine/professional-master-degree/master-veterinary-cardiology-small-animals](http://www.techtute.com/in/veterinary-medicine/professional-master-degree/master-veterinary-cardiology-small-animals)

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# 01

# Introduction

This program in Veterinary Cardiology in Small Animals has been developed by veterinary professionals with extensive experience in small animal cardiovascular medicine and surgery in both clinical and teaching settings. It compiles the different cardiovascular diseases affecting small animals, delving into the basics of cardiovascular physiology, pathophysiology and pharmacology so often forgotten, important and useful in daily clinical practice, followed by the optimization of clinical examination and diagnostic tests, and ending with the latest therapeutic protocols and patient monitoring procedures.



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*Develop the basis of cardiology and delve into the most up-to-date and advanced techniques available in the market, with this high-level training developed with the best didactic resources and taught by practicing professionals"*

Cardiology of Small Animals is a subspecialty of Internal Medicine with a great development in the last decades. The teachers of this Professional Master's Degree are at the forefront of the latest diagnostic techniques and treatment of cardiovascular diseases in small animals. Through their specialized studies, they have developed a useful, practical program adapted to the current reality, a reality that is becoming more and more demanding.

The teaching team has selected a syllabus that generates specialized knowledge and covers the physiology and pathophysiology of the Cardiovascular System, develops the main paradigms of clinical examination and complementary tests, as well as the most frequent cardiovascular diseases in the small animal clinic, including the most complex procedures and infrequent diseases.

This program specializes the general practitioner in an area that is increasingly in demand, partly because of its frequency and partly because of the need for specialization that this area demands.

In all the modules, a gradual exposition of knowledge at the physiological and pathophysiological level has been established, a development of the protocols for approaching patients with cardiovascular diseases with diagnostic and treatment algorithms, as well as the monitoring that should be done in these patients, since many of these diseases are chronic. It compiles the author's experience, without forgetting scientific rigor and the most important updates based on evidence. It develops the diseases, the action protocols and takes into account the integral approach to the patient, considering the disease, the patient and the owner in line with evidence-based medicine.

All modules include a large amount of multimedia material: photos, videos and diagrams, so important in a specialty where imaging techniques are of great importance.

As it is an online Professional Master's Degree, the student is not conditioned by fixed schedules and does not need to move to another physical location. All of the content can be accessed at any time of the day, so you can balance your working or personal life with your academic life.

This **Professional Master's Degree in Veterinary Cardiology in Small Animals** contains the most complete and up-to-date scientific program on the market. The most outstanding features of this program are:

- ♦ Development of practical cases presented by experts in Veterinary Cardiology in Small Animals
- ♦ 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
- ♦ Latest developments in Veterinary Cardiology in Small Animals
- ♦ Practical exercises where self-assessment can be used to improve learning
- ♦ Special emphasis on innovative methodologies in Veterinary Cardiology in Small Animals
- ♦ 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



*Do not miss the opportunity to take this Professional Master's Degree with TECH. It's the perfect opportunity to advance your career and stand out in an industry with high demand for professionals"*

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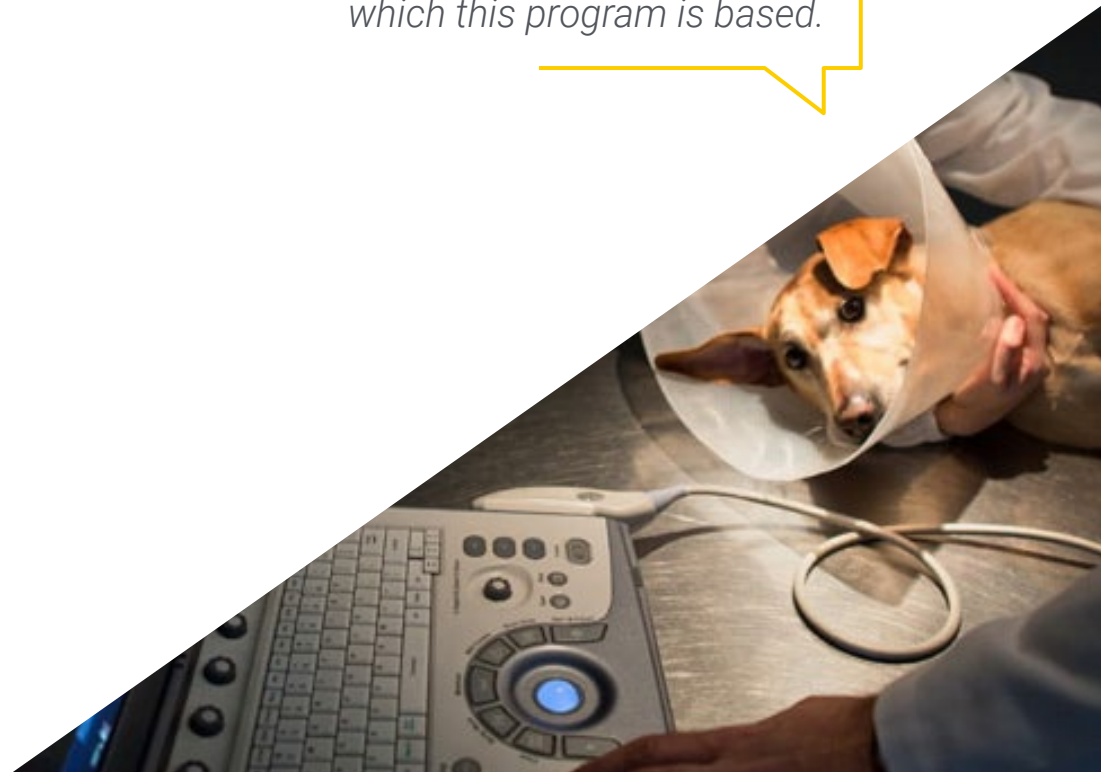
*This Professional Master's Degree is the best investment you can make in the selection of a refresher program to update your veterinary knowledge in Cardiology"*

Its Multimedia Content, elaborated with the latest Educational Technology, will allow the Professional a situated and contextual learning, that is to say, a Simulated Environment that will provide an immersive specialization programmed to train in real situations.

This program is designed around Problem-Based Learning, whereby the specialist must try to solve the different professional practice situations that arise during the academic year. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned experts with extensive experience in Veterinary Cardiology in Small Animals.

*This training comes with the best didactic material, providing you with a contextual approach that will facilitate your learning.*

*Learn about the latest advances in the field from the comfort of your home, thanks to the online mode on which this program is based.*



# 02 Objectives

The Professional Master's Degree in Veterinary Cardiology in Small Animals is aimed at facilitating the performance of the professional dedicated to Veterinary Medicine with the latest advances and newest treatments in the sector.







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*You will learn how to perform a correct anamnesis focused on the cardiovascular and respiratory system, with this highly scientifically rigorous program"*



## General Objectives

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- ♦ Examine the stages of embryonic development of the cardiovascular system
- ♦ Analyze cardiac and vascular anatomy
- ♦ Develop the normal function of the cardiovascular system
- ♦ Examine the main pathophysiological mechanisms of cardiac diseases in small animals
- ♦ Examine the pathophysiology of heart failure as the main paradigm of cardiology
- ♦ Assess the hygienic-dietary management of cardiovascular disease
- ♦ Analyze the key aspects of owner communication about cardiovascular disease in small animals
- ♦ Determine the drugs available for the treatment of cardiovascular diseases in small animals
- ♦ Determine the performance of a correct anamnesis focused on the cardiovascular and respiratory systems
- ♦ Analyze in detail the fundamentals, technique and information provided by cardiorespiratory auscultation
- ♦ Develop the main clinical pictures of cardiorespiratory diseases in small animals
- ♦ Analyze the diagnostic tests involved in the diagnosis and assessment of the cardiovascular system such as laboratory tests, cardiac markers and blood pressure measurement
- ♦ Establish the physical basis of radiology in a clear, precise and applicable manner
- ♦ Determine the radiographic technique to be used for the performance of correct thoracic radiographs
- ♦ Analyze the radiological findings of a normal thoracic radiograph
- ♦ Examine the radiological signs of the main diseases affecting the thoracic cavity
- ♦ Analyze sonographic signs in non-cardiac diseases affecting the thoracic cavity
- ♦ Develop and systematize a routine for the acquisition of high-quality electrocardiographic tracings
- ♦ Firmly consolidate knowledge of the characteristics of physiological electrical activity and identify those variations that are in the range of normality
- ♦ Delve into the electrophysiological mechanisms that cause arrhythmias
- ♦ Identify patients requiring therapeutic intervention
- ♦ Analyze the physical principles of ultrasound, which are the basis of imaging in echocardiography
- ♦ Establish the protocol for performing echocardiography and analyze in detail all the parameters that can be obtained through echocardiography
- ♦ Examine in depth the information provided by echocardiography in the hemodynamic assessment of patients
- ♦ Present advanced echocardiographic techniques and new advances in the field of echocardiography
- ♦ Develop in detail the diagnosis of chronic degenerative valve disease
- ♦ Assess treatments and new therapies that have been developed in recent years for chronic degenerative valve disease
- ♦ Analyze the assessment and treatment of patients with pericardial effusion and patients with bacterial endocarditis
- ♦ Consolidate the phenotypic characteristics that define each of the cardiomyopathies affecting small animals
- ♦ Generate specialized knowledge in the diagnosis of the etiological causes that can lead to a cardiomyopathy phenotype



- ◆ Determine the possible hemodynamic consequences of cardiomyopathies
- ◆ Develop an individualized treatment plan to maximize the quality of life and life expectancy of affected patients
- ◆ Analyze the embryological mechanisms that give rise to the most frequent congenital alterations
- ◆ Reinforce the need for early diagnosis of congenital disease
- ◆ Anticipate the possible hemodynamic consequences of these alterations, which may be treatable
- ◆ Consolidate knowledge of interventional techniques
- ◆ Develop an appropriate diagnostic protocol to avoid missing the presence of secondary cardiac disease or systemic disease that may affect the cardiovascular system
- ◆ Anticipate possible cardiovascular complications in the course of other primary pathologies
- ◆ Integrate information from internal medicine with information from cardiology to design individualized treatment plans
- ◆ Simultaneous monitoring of cardiovascular disease and primary disease in order to prioritize etiologic therapies and reduce polypharmacy



## Specific Objectives

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### Module 1. Cardiac Embryology, Anatomy, Physiology and p-Pathophysiology.

- ◆ Compile the chronology of embryonic and fetal development of the cardiovascular system in small animals
- ◆ Examine cardiac macro- and microstructural morphology and vascular macro- and microstructural morphology
- ◆ Develop the fundamental hemodynamic principles underlying cardiac physiology.
- ◆ Determine the functions and design of the cardiovascular system
- ◆ Examine the contractile function of the heart
- ◆ Establish the parts of the cardiac cycle
- ◆ Analyze the factors on which cardiac output depends and the main mechanisms of cardiovascular regulation
- ◆ Assess the main pathophysiological mechanisms involved in diseases of the endocardium, myocardium and pericardium
- ◆ Generate specialized knowledge on cardiogenic pulmonary edema

### Module 2. Heart Failure Cardiac Pharmacology

- ◆ Analyze the pathophysiological mechanisms of heart failure and its repercussions on the rest of the systems and apparatuses
- ◆ Compile the existing evidence on the dietary management of cardiovascular disease in small animals
- ◆ Establish guidelines to provide correct information to the owner about the pet's cardiovascular disease
- ◆ Establish the mechanism of action, indications, adverse effects and contraindications of the main drugs used in the treatment of heart failure such as ACE inhibitors, diuretics and pimobedan

- ◆ Examine the mechanism of action, indications, posology, adverse effects and contraindications of the main drugs used in the treatment of arrhythmias
- ◆ Determine the mechanism of action, indications, posology, adverse effects and contraindications of anticoagulant drugs

### Module 3. Anamnesis and Cardiovascular Examination.

- ◆ Establish the key questions and their epidemiological and pathophysiological correlates of cardiorespiratory anamnesis in small animals
- ◆ Develop the fundamentals of cardiopulmonary auscultation and its implication in the clinic
- ◆ Examine cardiac and pulmonary auscultation technique
- ◆ Analyze the information that cardiac and pulmonary auscultation can provide in the differential diagnosis
- ◆ Identify the key aspects for the diagnosis of the clinical picture of cough and dyspnea
- ◆ Establish the key aspects for the diagnosis of the clinical picture of cyanosis and the clinical picture of syncope
- ◆ Determine the proper technique for measuring blood pressure and the information it provides in cardiovascular diseases
- ◆ Examine the proper technique for measuring central venous pressure and the information it provides in patients in critical care units
- ◆ Analyze basic blood count and biochemistry parameters that may be altered in cardiovascular disease
- ◆ Compile specialized knowledge to interpret the information provided by the assessment of cardiac markers in cardiorespiratory disease



#### **Module 4. Complementary Tests. Diagnostic Imaging**

- ◆ Develop the physical fundamentals of Radiology
- ◆ Determine the radiographic technique for the assessment of the thoracic cavity
- ◆ Analyze the normal radiological findings of the thoracic cavity of small animals
- ◆ Establish the main errors in the radiological technique and their implication in the diagnosis
- ◆ Determine the radiological findings in thoracic diseases affecting extrathoracic structures, mediastinum, esophagus and trachea
- ◆ Generate specialized knowledge about normal ultrasound findings and non-cardiac diseases of the thoracic cavity

#### **Module 5. Complementary Tests. Electrocardiogram**

- ◆ Generate specialized knowledge on tools for the unambiguous identification of P-waves
- ◆ Develop a systematic method for understanding the electrical activity illustrated by the ECG tracing
- ◆ Establish the characteristics that allow discerning the etiology of the arrhythmia
- ◆ Establish criteria to define the anatomical origin of the arrhythmia
- ◆ Specify the criteria defining the malignancy of an arrhythmia
- ◆ Clearly define patients who require a Holter study
- ◆ Develop advanced techniques in the range of therapeutic possibilities

### Module 6. Complementary Tests. Echocardiography

- ♦ Establish the basic principles of image formation in echocardiography
- ♦ Identify the main artifacts that may appear during the echocardiographic technique
- ♦ Determine patient preparation and positioning guidelines for echocardiography
- ♦ Determine the common echocardiographic slices and develop the information that can be obtained from them in the M-mode and two-dimensional modes
- ♦ Review Doppler measurements and assessment and highlight its importance in hemodynamic assessment
- ♦ Develop in depth hemodynamic assessment in terms of systolic, diastolic, spectral and color Doppler function
- ♦ Determine the use of thoracic ultrasound in other diseases that may be a consequence of cardiac disease
- ♦ Develop expertise in the performance and assessment of echocardiography in small mammals

### Module 7. Acquired Heart Diseases. Chronic mitral and tricuspid valve disease. Endocarditis Pericardial alterations. Cardiac masses

- ♦ Generate specialized knowledge on the epidemiology of chronic degenerative valve disease
- ♦ Determine an assessment protocol in chronic degenerative valve disease
- ♦ Analyze the different tests used in the diagnosis of chronic degenerative valve disease
- ♦ Compile the information available on the therapy of chronic degenerative valve disease
- ♦ Propose a diagnostic and therapeutic algorithm for pericardial effusion
- ♦ Develop the pericardiocentesis technique
- ♦ Examine the etiology of bacterial endocarditis
- ♦ Determine a diagnostic and therapeutic algorithm for bacterial endocarditis



### Module 8. Acquired Heart Diseases. Cardiomyopathies

- ♦ Develop a diagnostic protocol for the phenotype of canine dilated cardiomyopathy and the features that may raise suspicion of secondary cardiomyopathy
- ♦ Systematically assess the possible presence of etiologic causes of canine dilated cardiomyopathy that can be treated
- ♦ Develop an assessment of the risk of negative events in cases of dilated and arrhythmogenic right cardiomyopathy
- ♦ Develop an individualized treatment protocol to maximize the patient's life expectancy, and sometimes reverse the phenotype
- ♦ Specify the echocardiographic criteria for the diagnosis of feline hypertrophic cardiomyopathy
- ♦ Generate advanced knowledge on the latest feline hypertrophic cardiomyopathy staging model for clinical decision making
- ♦ Analyze the differentiating characteristics of other types of feline cardiomyopathies

### Module 9. Congenital Heart Disease

- ♦ Generate specialized knowledge for a correct understanding of the embryological mechanisms of each of the pathologies that may predispose to the presence of several simultaneous alterations
- ♦ Establish the anatomical characteristics of patent ductus arteriosus that advise surgical or interventional treatment
- ♦ Review the various surgical and interventional techniques available for the treatment of pulmonary stenosis
- ♦ Develop available treatment modalities for aortic stenosis
- ♦ Compile available diagnostic techniques to determine the direction of shunt in intra- and extra-chamber communications
- ♦ Establish anatomical criteria to differentiate between congenital and acquired heart valve processes
- ♦ Predict the hemodynamic consequences of vascular defects or multiple defects

### Module 10. Pulmonary and systemic hypertension, systemic diseases with cardiac repercussions and anesthesia in the cardiac patient.

- ♦ Deepen the understanding of the pathophysiological mechanisms that may lead to the development of pulmonary hypertension
- ♦ Identify echocardiographic features that may be helpful in the diagnosis of pulmonary hypertension in the presence and absence of tricuspid regurgitation
- ♦ Quantify the damage generated in target organs by systemic hypertension
- ♦ Familiarity with the most frequently used drugs for the treatment of systemic hypertension and monitoring of therapy
- ♦ Consolidate the treatment protocols most commonly used in filariasis, and identify the differences in the pathophysiology of the disease in dogs and cats
- ♦ Monitoring response to etiologic treatment of hyperthyroidism in feline cardiac anatomy
- ♦ Assess the hemodynamic consequences of metabolic diseases that induce hypercoagulable state
- ♦ Assess the need for surgical intervention and its risks in cases of pheochromocytoma
- ♦ Consider the advantages and disadvantages of antiarrhythmic treatments in cases of splenic disease or gastric dilatation/torsion syndrome
- ♦ Identify the hemodynamic consequences of electrolyte disturbances



*Update your knowledge through the program in Veterinary Cardiology in Small Animals"*

# 03 Skills

Once this training has been completed, the professional will have acquired the necessary skills for a quality and up-to-date praxis based on the most innovative didactic methodology.





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*This program will help you acquire the skills you need to excel in your daily work”*



## Skills

- ♦ Examine the main pathophysiological mechanisms of cardiac diseases in small animals
- ♦ Examine the pathophysiology of heart failure as the main paradigm of cardiology
- ♦ Analyze the diagnostic tests involved in the diagnosis and assessment of the cardiovascular system such as laboratory tests, cardiac markers and blood pressure measurement
- ♦ Analyze sonographic signs in non-cardiac diseases affecting the thoracic cavity
- ♦ Delve into the electrophysiological mechanisms that cause arrhythmias
- ♦ Identify patients requiring therapeutic intervention
- ♦ Examine in depth the information provided by echocardiography in the hemodynamic assessment of patients
- ♦ Assess treatments and new therapies that have been developed in recent years for chronic degenerative valve disease
- ♦ Develop an individualized treatment plan to maximize the quality of life and life expectancy of affected patients
- ♦ Analyze the embryological mechanisms that give rise to the most frequent congenital alterations
- ♦ Simultaneous monitoring of cardiovascular disease and primary disease in order to prioritize etiologic therapies and reduce polypharmacy





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*Improve the care of your patients by taking advantage of the training offered by the Professional Master's Degree in Veterinary Cardiology in Small Animals”*

04

# Course Management

The teaching staff of the program includes leading experts in Veterinary Cardiology in Small Animals who bring the experience of their work to this specialization. They are world-renowned veterinarians from different countries with proven theoretical and practical professional experience.





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*The faculty in this program are experts in small animal cardiology and will help you succeed in your profession"*

## Management



### Dr. Martínez Delgado, Rubén

- Since 2017, he has headed the Cardiology service at the Estoril Veterinary Hospital, Móstoles.
- Collaborates with the Veterinary Hospital of the UCM developing the part of minimally invasive interventional cardiology.
- From 2010 to the present, he has been working as an ambulatory Cardiologist in many centers in Madrid and surrounding areas.
- Graduated in Veterinary Medicine in 2008 from the Complutense University of Madrid (UCM).
- Internships in Surgery (2006) and in Cardiology (2007-2008) at UCM.
- 2008 collaboration project in minimally invasive interventional cardiology in the cardiology service of the UCM.
- From 2009 to 2010 he completed the Intership of the official internship of the European College of Internal Medicine (ECVIM) at the Gran Sasso Veterinary Clinic in Milan (a reference center in cardiology and ultrasound diagnosis and a center specialized in interventional cardiology).
- He is a member of AVEPA and GECAR and a regular attendee of congresses in the specialty of Cardiology and Diagnostic Imaging. He has also presented several lectures on electrocardiography and echocardiography.

## Professors

### Dr. Cortés Sánchez, Pablo M

- ♦ Externship in Cardiology at the University of Glasgow, as a result of which he began a Master's Degree in Veterinary Medicine (MVM), which he is currently pursuing.
- ♦ Head of the Cardiology service and co-director of the Intensive Care Unit (ICU) of the Estoril Veterinary Hospital, Móstoles, Madrid (2007 to 2017).
- ♦ Head of Cardiology service and part of the ICU team at Braid Vets, Edinburgh UK (January 2018 to July 2019).
- ♦ Graduated in veterinary medicine from the Complutense University of Madrid (UCM) in 2007, including a year of scholarship studies at the University of Southern Indiana (USA).
- ♦ Internships in Internal Medicine (2006) and Cardiology at UCM (2007).
- ♦ Master's Degree in Cardiology for generalists by ISVPS (International School of Veterinary Postgraduate Studies) in 2011.
- ♦ Master's Degree in Veterinary Medicine (MVM) at present
- ♦ Internship in Cardiology at the University of Liverpool (2017), with completion of a research project in mitral disease pending publication.
- ♦ Speaker in cardiology, radiology, intensive care and anesthesia, sponsored by prestigious firms, both in Spain and in the UK
- ♦ Member of GECAR (Cardiology and Respiratory System Specialists Group), and certified in echocardiography by this institution, for which he is currently developing the official echocardiographic screening guidelines for congenital heart disease.
- ♦ Registered member of the Royal College of Veterinary Surgeons (RCVS), UK, which has certified him as an Advanced Veterinary Practitioner.

### Dr. Gómez Trujillo, Blanca

- ♦ Head of the Cardiology Service of the Madrid Este Veterinary Hospital.
- ♦ Veterinarian, member of the Cardiology and Echocardiography Service of the VETSIA Veterinary Hospital.
- ♦ Veterinary Degree. Complutense University of Madrid
- ♦ General Certificate in Small Animal Medicine. ISVPS
- ♦ Postgraduate course in Small Animal Internal Medicine. Improve International. Madrid
- ♦ Small Animal Cardiology Course. FORVET. Madrid
- ♦ Course of Echocardiography in Small Animals. FORVET. Madrid

### Dr. Ortiz Díez, Gustavo

- ♦ PhD and Undergraduate Degree in Veterinary Medicine from the UCM
- ♦ Master's Degree in Research Methodology in Health Sciences from the UAB
- ♦ Specialist in Traumatology and Orthopedic Surgery in Companion Animals by the UCM. Degree in Small Animal Cardiology from the UCM
- ♦ Member of the scientific committee and current president of GECIRA (AVEPA's Soft Tissue Surgery Specialty Group)
- ♦ Associate Professor, Department of Animal Medicine and Surgery, Faculty of Veterinary Medicine, Complutense University of Madrid.
- ♦ Head of Small Animal Unit at Complutense Clinical Veterinary Hospital.

05

# Structure and Content

The structure of the contents has been designed by the best professionals in the field of Veterinary Cardiology in Small Animals, with extensive experience and recognized prestige in the profession, backed by the volume of cases reviewed, studied and diagnosed, and with extensive knowledge of new technologies applied to veterinary medicine.





A close-up photograph of a grey rabbit's face, showing its eyes, whiskers, and ears. The rabbit is looking slightly to the right. The background is blurred, showing a person in a white lab coat and a blue shirt. The image is partially obscured by a teal diagonal graphic element.

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*This Professional Master's Degree contains the most complete and up-to-date scientific program in Veterinary Cardiology on the market today"*

## Module 1. Cardiac Embryology, Anatomy, Physiology and Pathophysiology

- 1.1. Cardiac and Vascular Embryology
  - 1.1.1. Cardiac Embryology
  - 1.1.2. Vascular Embryology
- 1.2. Cardiac and Vascular Anatomy and Histology
  - 1.2.1. Cardiac Anatomy
  - 1.2.2. Vascular Anatomy
  - 1.2.3. Cardiac Histology
  - 1.2.4. Vascular Histology
- 1.3. Normal Cardiovascular Physiology
  - 1.3.1. Functions
  - 1.3.2. Circulation Design
  - 1.3.3. Contractibility
- 1.4. Normal Cardiovascular Physiology
  - 1.4.1. Cardiac Cycle
- 1.5. Normal Cardiovascular Physiology
  - 1.5.1. Blood Vessel Physiology
  - 1.5.2. Systemic and Pulmonary Circulation
- 1.6. Cardiac Pathophysiology
  - 1.6.1. Cardiovascular Regulation
- 1.7. Cardiac Pathophysiology
  - 1.7.1. Hemodynamic Concepts
  - 1.7.2. Cardiac Output On What Does It Depend?
- 1.8. Cardiac Physiopathology
  - 1.8.1. Valvulopathies
- 1.9. Cardiac Pathophysiology
  - 1.9.1. Pericardium
  - 1.9.2. Cardiomyopathies
  - 1.9.3. Vascular Physiopathology
- 1.10. Cardiac Physiopathology
  - 1.10.1. Pulmonary Edema

## Module 2. Heart Failure Cardiac Pharmacology

- 2.1. Congestive Heart Failure
  - 2.1.1. Definition
  - 2.1.2. Physiopathological Mechanisms
  - 2.1.3. Pathophysiological Consequences
- 2.2. Dietary Hygiene Management. Communication With the Owner
  - 2.2.1. Communication With the Owner
  - 2.2.2. Feeding in the Cardiac Patient
- 2.3. Angiotensin-Converting Enzyme Inhibitors (ACE Inhibitors)
  - 2.3.1. Mechanism of Action
  - 2.3.2. Types
  - 2.3.3. Indications
  - 2.3.4. Posology
  - 2.3.5. Side effects:
  - 2.3.6. Contraindications
- 2.4. Pimobendan and Other Inotropics
  - 2.4.1. Pimobendan
    - 2.4.1.1. Mechanism of Action
    - 2.4.1.2. Indications
    - 2.4.1.3. Posology
    - 2.4.1.4. Side effects:
    - 2.4.1.5. Contraindications
  - 2.4.2. Sympathomimetics
    - 2.4.2.1. Mechanism of Action
    - 2.4.2.2. Indications
    - 2.4.2.3. Posology
    - 2.4.2.4. Side effects:
    - 2.4.2.5. Contraindications
  - 2.4.3. Others



- 2.5. Diuretics
  - 2.5.1. Mechanism of Action
  - 2.5.2. Types
  - 2.5.3. Indications
  - 2.5.4. Posology
  - 2.5.5. Side effects:
  - 2.5.6. Contraindications
- 2.6. Antiarrhythmics I
  - 2.6.1. Preliminary Considerations
  - 2.6.2. Classification of Antiarrhythmics
  - 2.6.3. Class 1 Antiarrhythmics
- 2.7. Antiarrhythmics II
  - 2.7.1. Class 2 Antiarrhythmics
  - 2.7.2. Class 3 Antiarrhythmics
  - 2.7.3. Class 4 Antiarrhythmics
- 2.8. Antihypertensive Drugs
  - 2.8.1. Venous
  - 2.8.2. Arterials
  - 2.8.3. Mixed
  - 2.8.4. Pulmonary
- 2.9. Anticoagulants
  - 2.9.1. Heparins
  - 2.9.2. Clopidogrel
  - 2.9.3. IAAS
  - 2.9.4. Others
- 2.10. Other Drugs Used in the Treatment of Cardiovascular Disease
  - 2.10.1. Angiotensin Receptor Antagonists II
  - 2.10.2. Spironolactone (Fibrosis and Antiremodeling Study)
  - 2.10.3. Carvedilol
  - 2.10.4. Positive Chronotropics
  - 2.10.5. Atropine (Atropine Test)
  - 2.10.6. Taurine in CMD
  - 2.10.7. Atenolol in Stenosis
  - 2.10.8. Atenolol or Diltiazem in Obstructive HCM

### Module 3. Anamnesis and Cardiovascular Examination

- 3.1. Cardiovascular and Respiratory Anamnesis
  - 3.1.1. Epidemiology of Heart Disease
  - 3.1.2. Medical History
    - 3.1.2.1. General Symptoms
    - 3.1.2.2. Specific Symptoms
- 3.2. Cardiovascular and Respiratory Examination
  - 3.2.1. Respiratory Pattern
  - 3.2.2. Exploration of the Head
  - 3.2.3. Neck Exploration
  - 3.2.4. Examination of the Thorax
  - 3.2.5. Examination of the Abdomen
  - 3.2.6. Other Explorations
- 3.3. Auscultation I
  - 3.3.1. Physical Principles
  - 3.3.2. Phonendoscope
  - 3.3.3. Technique
  - 3.3.4. Heart Sounds
- 3.4. Auscultation II
  - 3.4.1. Murmurs
  - 3.4.2. Pulmonary Auscultation
- 3.5. Cough
  - 3.5.1. Definition and Pathophysiological Mechanisms
  - 3.5.2. Differential Diagnoses and Diagnostic Algorithm for Cough
- 3.6. Dyspnoea
  - 3.6.1. Definition and Pathophysiological Mechanisms
  - 3.6.2. Differential Diagnoses and Diagnostic Algorithm for Dyspnoea
- 3.7. Syncope.
  - 3.7.1. Definition and Pathophysiological Mechanisms
  - 3.7.2. Differential Diagnoses and Diagnostic Algorithm for Syncope

- 3.8. Cyanosis
  - 3.8.1. Definition and Pathophysiological Mechanisms
  - 3.8.2. Differential Diagnoses and Diagnostic Algorithm for Syncope
- 3.9. Arterial and Central Pressure Venous Pressure
  - 3.9.1. Arterial Pressure
  - 3.9.2. Central Venous Pressure
- 3.10. Laboratory Tests and Cardiac Markers
  - 3.10.1. Laboratory Tests in Heart Disease
  - 3.10.2. Cardiac Biomarkers
  - 3.10.3. Genetic Tests

### Module 4. Complementary Tests Diagnostic Imaging

- 4.1. Principles of Radiology
  - 4.1.1. Physical Fundamentals of X-ray Production
  - 4.1.2. X-ray Machine
  - 4.1.3. Selection of mAs and Kv
  - 4.1.4. Types of Radiology
- 4.2. Radiographic Technique in Thoracic Radiology
  - 4.2.1. Radiographic Technique
  - 4.2.2. Positioning
- 4.3. Thoracic Radiography I
  - 4.3.1. Assessment of a Thoracic Radiography
  - 4.3.2. Diseases of Extra-thoracic Structures
- 4.4. Thoracic Radiology II
  - 4.4.1. Tracheal Diseases
  - 4.4.2. Mediastinal Diseases
- 4.5. Thoracic Radiology III
  - 4.5.1. Diseases of the Pleura
  - 4.5.2. Diseases of the Esophagus
- 4.6. Cardiac Silhouette I
  - 4.6.1. Assessment of Normal Cardiac Silhouette
  - 4.6.2. Size
  - 4.6.3. Topography

- 4.7. Cardiac Silhouette II
  - 4.7.1. Diseases Affecting the Heart
  - 4.7.2. Imported
- 4.8. Pulmonary Parenchyma I
  - 4.8.1. Assessment of Normal Lung Parenchyma
  - 4.8.2. Pulmonary Patterns I
- 4.9. Pulmonary Parenchyma II
  - 4.9.1. Pulmonary Patterns II
  - 4.9.2. Radiologic Findings in Pulmonary Parenchymal Diseases
- 4.10. Other Tests
  - 4.10.1. Pulmonary Ultrasound
  - 4.10.2. Bubble Study

## Module 5. Complementary Tests. Electrocardiogram

- 5.1. Anatomy of the Conduction System and Action Potentials
  - 5.1.1. Sinus Node and Supraventricular Conduction Pathways
  - 5.1.2. Atrioventricular Node and Ventricular Conduction Pathways
  - 5.1.3. Action Potential
    - 5.1.3.1. Pacemaker Cells
    - 5.1.3.2. Contractile Cells
- 5.2. Obtaining a High-Quality Electrocardiographic Tracing
  - 5.2.1. Limb Lead System
  - 5.2.2. Precordial Lead System
  - 5.2.2. Artifact Reduction
- 5.3. Sinus Rhythm
  - 5.3.1. Typical Electrocardiographic Characteristics of Sinus Rhythm
  - 5.3.2. Respiratory Sinus Arrhythmia
  - 5.3.3. Non-Respiratory Sinus Arrhythmia
  - 5.3.4. Wandering Pacemaker
  - 5.3.5. Sinus Tachycardia
  - 5.3.6. Sinus Bradycardia
  - 5.3.7. Intraventricular Conduction Blocks
- 5.4. Electrophysiological Mechanisms Causing Arrhythmias
  - 5.4.1. Stimulus Formation Disorders
    - 5.4.1.1. Altered Normal Automatism
    - 5.4.1.2. Abnormal Automatism
    - 5.4.1.3. Triggered Activity: Late Postpotentials
    - 5.4.1.4. Triggered Activity: Early Postpotentials
  - 5.4.2. Impulse Conduction Disorders
    - 5.4.2.1. Anatomical Re-entry
    - 5.4.2.2. Functional Re-entry
- 5.5. Supraventricular Arrhythmias I
  - 5.5.1. Atrial Premature Complexes
  - 5.5.2. Paroxysmal Supraventricular Tachycardia
  - 5.5.3. Atrioventricular Junctional Tachycardia
  - 5.5.4. Accessory Conduction Routes
- 5.6. Supraventricular Arrhythmias II: Atrial Fibrillation
  - 5.6.1. Anatomical and Functional Substrate
  - 5.6.2. Hemodynamic Consequences
  - 5.6.3. Treatment for Frequency Control
  - 5.6.4. Treatment for Rhythm Control
- 5.7. Ventricular Arrhythmias
  - 5.7.1. Ventricular Premature Complexes
  - 5.7.2. Monomorphic Ventricular Tachycardia
  - 5.7.3. Polymorphic Ventricular Tachycardia
  - 5.7.4. Idioventricular Rhythm
- 5.8. Bradyarrhythmias
  - 5.8.1. Sick Sinus Disease
  - 5.8.2. Atrioventricular Block
  - 5.8.3. Atrial Silence
- 5.9. Holter
  - 5.9.1. Holter Monitoring Indications
  - 5.9.2. Equipment
  - 5.9.3. Interpretation
- 5.10. Advanced Treatment Techniques
  - 5.10.1. Pacemaker Implantation
  - 5.10.2. Radiofrequency Ablation

## Module 6. Complementary Tests Echocardiography

- 6.1. Introduction Ultrasound and Equipment
  - 6.1.1. Ultrasound Physics
  - 6.1.2. Equipment and Transducers
  - 6.1.3. Doppler
  - 6.1.4. Artefacts
- 6.2. Echocardiographic Examination
  - 6.2.1. Patient Preparation and Positioning
  - 6.2.2. 2D Two-dimensional Echocardiography
    - 6.2.2.1. Echocardiographic Slicing
    - 6.2.2.2. Two-dimensional Image Controls
  - 6.2.3. M-Mode
  - 6.2.4. Spectral Doppler
  - 6.2.5. Color Doppler
  - 6.2.6. Tissue Doppler
- 6.3. Measurements and Assessment of 2D and M-mode Images
  - 6.3.1. General aspects
  - 6.3.2. Left Ventricle and Mitral Valve
  - 6.3.3. Left Atrium
  - 6.3.4. Aorta
  - 6.3.5. Right Ventricle and Tricuspid Valve
  - 6.3.6. Right Atrium and Caval Veins
  - 6.3.7. Pulmonary Trunk and Arteries
  - 6.3.8. Pericardium
- 6.4. Doppler Measurements and Assessment
  - 6.4.1. General aspects
    - 6.4.1.1. Alignment
    - 6.4.1.2. Laminar and Turbulent Flow
    - 6.4.1.3. Hemodynamic Information
  - 6.4.2. Spectral Doppler: Aortic and Pulmonary Flow
  - 6.4.3. Spectral Doppler: Mitral and Tricuspid Flow
  - 6.4.4. Spectral Doppler: Flow of the Pulmonary and Left Atrial Veins
  - 6.4.5. Colour Doppler Assessment
  - 6.4.6. Tissue Doppler Measurement and Assessment



- 6.5. Advanced Echocardiography
  - 6.5.1. Tissue Doppler-Derived Techniques
  - 6.5.2. Transesophageal Echocardiogram
  - 6.5.3. 3D Echocardiography
- 6.6. Hemodynamic Assessment I
  - 6.6.1. Left Ventricular Systolic Function
    - 6.6.1.1. M-Mode Analysis
    - 6.6.1.2. Two-Dimensional Analysis
    - 6.6.1.3. Spectral Doppler Analysis
    - 6.6.1.4. Tissue Doppler Analysis
- 6.7. Hemodynamic Assessment II
  - 6.7.1. Left Ventricular Diastolic Function
    - 6.7.1.1. Types of Diastolic Dysfunction
  - 6.7.2. Left Ventricular Filling Pressures
  - 6.7.3. Right Ventricular Function
    - 6.7.3.1. Radial Systolic Function
    - 6.7.3.2. Longitudinal Systolic Function
    - 6.7.3.3. Tissue Doppler
- 6.8. Hemodynamic Assessment III
  - 6.8.1. Spectral Doppler
    - 6.8.1.1. Pressure Gradients
    - 6.8.1.2. *Pressure Half-Time*
    - 6.8.1.3. Regurgitation Volume and Fraction
    - 6.8.1.4. *Shunt Quota*
  - 6.8.2. M-Mode
    - 6.9.2.1. Aorta
    - 6.9.2.2. Mitral
    - 6.9.2.3. Septum
    - 6.9.2.4. Left Ventricular Free Wall

- 6.9. Hemodynamic Assessment IV
  - 6.9.1. Color Doppler
    - 6.9.1.1. Jet Size
    - 6.9.1.2. PISA
    - 6.9.1.3. Contracted Vein
  - 6.9.2. Assessment of Mitral Regurgitation
  - 6.9.3. Assessment of Tricuspid Regurgitation
  - 6.9.4. Assessment of Aortic Regurgitation
  - 6.9.5. Assessment of Pulmonary Regurgitation
- 6.10. Thoracic Ultrasound Scan
  - 6.10.1. Thoracic Ultrasound Scan
    - 6.10.1.1. Spills
    - 6.10.1.2. Masses
    - 6.10.1.3. Pulmonary Parenchyma
  - 6.10.2. Echocardiography in Exotic Animals
    - 6.10.2.1. Rabbits
    - 6.10.2.2. Ferrets
    - 6.10.2.3. Rodents
  - 6.10.3. Others

## Module 7. Acquired Heart Diseases Chronic Mitral and Tricuspid Valve Disease Endocarditis Pericardial Alterations Cardiac Masses

- 7.1. Chronic Degenerative Valve Disease I. Etiology
  - 7.1.1. Valvular Anatomy
  - 7.1.2. Etiology
  - 7.1.3. Prevalence
- 7.2. Chronic Degenerative Valve Disease II. Pathology
  - 7.2.1. Pathophysiology
  - 7.2.2. Staging and Classification
- 7.3. Chronic Degenerative Valve Disease III. Diagnosis
  - 7.3.1. History and Exploration
  - 7.3.2. Radiology
  - 7.3.3. Electrocardiogram (ECG)
  - 7.3.4. Echocardiography
  - 7.3.5. Biochemical Tests
  - 7.3.6. Differential Diagnoses

- 7.4. Chronic Degenerative Valve Disease III. Echocardiographic Assessment
  - 7.4.1. Valvular Anatomy
    - 7.4.1.1. Appearance and Movement
    - 7.4.1.2. Degenerative Lesions
    - 7.4.1.3. Prolapses
    - 7.4.1.4. Ruptured Chordae Tendineae
  - 7.4.2. Dimensions and Functionality of the Left Ventricle
  - 7.4.3. Quantification of Regurgitation
  - 7.4.4. Echocardiographic Staging
    - 7.4.4.1. Cardiac Remodeling
    - 7.4.4.2. Regurgitation Flows and Fraction
    - 7.4.4.3. Left Atrial Pressures
    - 7.4.4.4. Pulmonary Hypertension
- 7.5. Chronic Degenerative Valve Disease IV. Progression and Decompensation Risk Analysis
  - 7.5.1. Risk Factors for Progression
  - 7.5.2. Decompense Prediction
  - 7.5.3. Particularities in the Evolution of Tricuspid Pathology
  - 7.5.4. Owner's Role
  - 7.5.5. Periodicity of Revisions
- 7.6. Chronic Degenerative Valve Disease V. Therapies
  - 7.6.1. Medical Treatment
  - 7.6.2. Surgical Management
- 7.7. Chronic Degenerative Valve Disease VI. Complicating Factors
  - 7.7.1. Arrhythmias
  - 7.7.2. Pulmonary Hypertension
  - 7.7.3. Systemic Arterial Hypertension
  - 7.7.4. Renal Insufficiency
  - 7.7.5. Atrial Rupture







- 7.8. Infectious Endocarditis
  - 7.8.1. Aetiology and Pathophysiology of Bacterial Endocarditis
  - 7.8.2. Diagnosis of Bacterial Endocarditis
  - 7.8.3. Treatment of Bacterial Endocarditis
- 7.9. Pericardial Alterations
  - 7.9.1. Pericardium Anatomy and Physiology
  - 7.9.2. Pathophysiology of Pericardial Tamponade
  - 7.9.3. Diagnosis of Pericardial Tamponade
  - 7.9.4. Types of Pericardial Alterations
    - 7.9.4.1. Hernias and Defects
    - 7.9.4.2. Spills or Effusions (Types and Origins)
    - 7.9.4.3. Masses
    - 7.9.4.4. Constrictive Pericarditis
  - 7.9.5. Pericardiocentesis and Protocol of Action
- 7.10. Cardiac Masses
  - 7.10.1. Aortic Base Tumors
  - 7.10.2. Hemangiosarcoma
  - 7.10.3. Mesothelioma
  - 7.10.4. Intracavitary Tumors
  - 7.10.5. Clots: Atrial Rupture

## Module 8 Acquired Heart Diseases Cardiomyopathies

- 8.1. Primary Canine Dilated Cardiomyopathy
  - 8.1.1. Definition of Primary Dilated Cardiomyopathy (DCM) and Histological Features
  - 8.1.2. Echocardiographic Diagnosis of DCM
  - 8.1.3. Electrocardiographic Diagnosis of Occult DCM
    - 8.1.3.1. Electrocardiogram (ECG)
    - 8.1.3.2. Holter
  - 8.1.4. CMD Therapy
    - 8.1.4.1. Hidden Phase
    - 8.1.4.2. Symptomatic Phase
- 8.2. Secondary Canine Dilated Cardiomyopathy
  - 8.2.1. Aetiological Diagnosis of Dilated Cardiomyopathy (DCM)
  - 8.2.2. DCM Secondary to Nutritional Deficiencies
  - 8.2.3. DCM Secondary to Other Causes
    - 8.2.3.1. Endocrine Disorders
    - 8.2.3.2. Toxins
    - 8.2.3.3. Others
- 8.3. Tachycardia-Induced Cardiomyopathy (TICM)
  - 8.3.1. Electrocardiographic Diagnosis of TICM
    - 8.3.1.1. Electrocardiogram (ECG)
    - 8.3.1.2. Holter
  - 8.3.2. TICM Therapy
    - 8.3.2.1. Pharmacotherapy
    - 8.3.2.2. Radiofrequency Ablation
- 8.4. Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC)
  - 8.4.1. Definition of ARVC and Histological Features
  - 8.4.2. Echocardiographic Diagnosis of ARVC
  - 8.4.3. Electrocardiographic Diagnosis of ARVC
    - 8.4.3.1. ECG
    - 8.4.3.2. Holter
  - 8.4.4. ARVC Therapy
- 8.5. Feline Hypertrophic Cardiomyopathy (HCM) I
  - 8.5.1. Definition of HCM and Histological Features
  - 8.5.2. Echocardiographic Diagnosis of HCM Phenotype
  - 8.5.3. Electrocardiographic Findings at HCM
- 8.6. Feline Hypertrophic Cardiomyopathy (HCM) II
  - 8.6.1. Aetiological Diagnosis of HCM
  - 8.6.2. Hemodynamic Consequences of HCM
  - 8.6.3. Staging of HCM
  - 8.6.4. Prognostic Factors in HCM
  - 8.6.5. HCM Therapy
    - 8.6.5.1. Asymptomatic Phase
    - 8.6.5.2. Symptomatic Phase
- 8.7. Other Feline Cardiomyopathies I
  - 8.7.1. Restrictive Cardiomyopathy (RCM)
    - 8.7.1.1. Histological Characteristics of RCM
    - 8.7.1.2. Echocardiographic Diagnosis of RCM Phenotype
    - 8.7.1.3. Electrocardiographic Findings in RCM
    - 8.7.1.4. RCM Therapy
  - 8.7.2. Feline Dilated Cardiomyopathy
    - 8.7.2.1. Histological Features of Feline Dilated Cardiomyopathy (DCM)
    - 8.7.2.2. Echocardiographic Diagnosis of the DCM Phenotype
    - 8.7.2.3. Etiologic Diagnosis of Feline DCM
- 8.8. Other Feline Cardiomyopathies II
  - 8.8.1. Feline Dilated Cardiomyopathy (DMC) (cont.)
    - 8.8.1.1. Therapy of Feline DCM
  - 8.8.2. End-stage Cardiomyopathies
    - 8.8.2.1. Echocardiographic Diagnosis
    - 8.8.2.2. Therapy of End-stage Cardiomyopathy
  - 8.8.3. Hypertrophic Obstructive Cardiomyopathy (HOCM)
- 8.9. Myocarditis
  - 8.9.1. Clinical Diagnosis of Myocarditis
  - 8.9.2. Etiologic Diagnosis of Myocarditis
  - 8.9.3. Non-etiological Therapy of Myocarditis
  - 8.9.4. Chagas Disease
- 8.10. Other Myocardial Alterations
  - 8.10.1. *Atrial Standstill*

- 8.10.2. Fibroelastosis
- 8.10.3. Cardiomyopathy Associated with Muscular Dystrophy (Duchenne)
- 8.10.4. Cardiomyopathy in Exotic Animals

## Module 9 Congenital Heart Disease

- 9.1. Patent Ductus Arteriosus (PDA) I
  - 9.1.1. Embryological Mechanisms that Give Rise to PDA
  - 9.1.2. Anatomical Classification of PDA
  - 9.1.3. Echocardiographic Diagnosis
- 9.2. Patent Ductus Arteriosus II
  - 9.2.1. Pharmacotherapy
  - 9.2.2. Interventional Therapy
  - 9.2.3. Surgical Therapies
- 9.3. Pulmonary Stenosis (PS) I
  - 9.3.1. Anatomical Classification of PS
  - 9.3.2. Echocardiographic Diagnosis of PS
  - 9.3.3. Pharmacotherapy
- 9.4. Pulmonary Stenosis II
  - 9.4.1. Interventional Therapy
  - 9.4.2. Surgical Therapies
- 9.5. Aortic Stenosis (AS) I
  - 9.5.1. Anatomical Classification of AS
  - 9.5.2. Echocardiographic Diagnosis of AS
  - 9.5.3. Pharmacotherapy
- 9.6. Aortic Stenosis II
  - 9.6.1. Interventional Therapy
  - 9.6.2. *Screening* Program Results
- 9.7. Ventricular Septal Defects (VSD)
  - 9.7.1. Anatomical Classification of VSD
  - 9.7.2. Echocardiographic Diagnosis
  - 9.7.3. Pharmacotherapy
  - 9.7.4. Surgical Therapies
  - 9.7.5. Interventional Therapy

- 9.8. Interatrial Septal Defects (ISD)
  - 9.8.1. Anatomical Classification of ISD
  - 9.8.2. Echocardiographic Diagnosis
  - 9.8.3. Pharmacotherapy
  - 9.8.4. Interventional Therapy
- 9.9. Atrioventricular Valve Dysplasia
  - 9.9.1. Tricuspid Dysplasia
  - 9.9.2. Mitral Dysplasia
- 9.10. Other Congenital Defects
  - 9.10.1. Tetralogy of Fallot
  - 9.10.2. Persistent Left Cranial Cava Vein
  - 9.10.3. Double Chamber Right Ventricle
  - 9.10.4. Aorto-Pulmonary Window
  - 9.10.5. Persistent Right Fourth Aortic Arch
  - 9.10.6. Cor Triatrium Dexter and Cor Triatrium Sinister
  - 9.10.7. Common Atrioventricular Canal

## Module 10. Pulmonary and Systemic Hypertension, Systemic Diseases with Cardiac Repercussions and Anesthesia in the Cardiac Patient

- 10.1. Pulmonary Hypertension (PH) I
  - 10.1.1. Definition of PH
  - 10.1.2. Echocardiographic Diagnosis of PH
  - 10.1.3. PH Classification
- 10.2. Pulmonary Hypertension II
  - 10.2.1. Additional Diagnostic Protocol in Animals Suspected of PH
  - 10.2.2. PH Treatment
- 10.3. Systemic Hypertension I
  - 10.3.1. Methods for Blood Pressure Measurement
  - 10.3.2. Diagnosis of Hypertension
  - 10.3.3. Pathophysiology of Systemic Hypertension
  - 10.3.4. Assessment of Target Organ Damage
  - 10.3.5. Hypertensive Cardiomyopathy

- 10.4. Systemic Hypertension II
  - 10.4.1. Patient Selection for Hypertension *Screening* Programs
  - 10.4.2. Treatment of Systemic Hypertension
  - 10.4.3. Monitoring of Treatment and Additional Target Organ Damage
- 10.5. Filariasis
  - 10.5.1. Etiological Agent
  - 10.5.2. Diagnosis of Filarial Infection
    - 10.5.2.1. Physical Methods
    - 10.5.2.2. Serological Methods
  - 10.5.3. Pathophysiology of Filarial Infestations
    - 10.5.3.1. Dogs
    - 10.5.3.2. Cats
  - 10.5.4. Echocardiographic Findings
  - 10.5.5. Treatment of Filariasis
    - 10.5.5.1. Medical Treatment
    - 10.5.5.2. Interventional Treatment
- 10.6. Endocrine Diseases Affecting the Heart I
  - 10.6.1. Hyperthyroidism
  - 10.6.2. Hypothyroidism
  - 10.6.3. Hyperadrenocorticism
  - 10.6.4. Hypoadrenocorticism
- 10.7. Endocrine Diseases Affecting the Heart II
  - 10.7.1. Diabetes
  - 10.7.2. Acromegaly
  - 10.7.3. Hyperaldosteronism
  - 10.7.4. Hyperparathyroidism
- 10.8. Other Systemic Alterations Affecting the Cardiovascular System I
  - 10.8.1. Pheochromocytoma
  - 10.8.2. Anaemia
  - 10.8.3. Uremia
  - 10.8.4. Toxics and Chemotherapeutics
  - 10.8.5. Shock.





- 10.9. Other Systemic Alterations Affecting the Cardiovascular System II
  - 10.9.1. Gastric Dilatation/Torsion
  - 10.9.2. Splenic Splenitis/Neoplasia
  - 10.9.3. Hypercoagulable State and Thrombosis
  - 10.9.4. Conditions Causing Hypo- or Hypercalcemia
  - 10.9.5. Conditions Causing Hypo- or Hyperkalemia
  - 10.9.6. Conditions Causing Hypo- or Hypermagnesemia
- 10.10. Anesthesia in Cardiac Patients
  - 10.10.1. Pre-Surgery Assessment
  - 10.10.2. Hemodynamic and Surgical Factors Involved in the Choice of Hypnotics
  - 10.10.3. Anesthetic Monitoring

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*Achieve professional success with this high-level training provided by prestigious professionals with extensive experience in the sector”*

06

# 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 you will be presented with multiple simulated clinical cases based on real patients, where you will have to investigate, establish hypotheses and, finally, resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, 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, in an attempt to recreate the actual conditions in a veterinarian's professional practice.



“

*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. Veterinarians who follow this method not only manage to assimilate concepts, but also develop their mental capacity through exercises to evaluate real situations and knowledge application
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. The feeling that the effort invested is effective becomes a very important motivation for veterinarians, which translates into a greater interest in learning and an increase in the time dedicated to working on the course.



## Relearning Methodology

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

This 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, a real revolution with respect to the mere study and analysis of cases.



*Veterinarians will learn through real cases and by resolving 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 65,000 veterinarians have been trained with unprecedented success in all clinical specialties, regardless of the surgical load. Our teaching method is developed in a highly demanding environment, where the students have a high socio-economic 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 training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for 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 produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

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.



#### Latest Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current and procedures of veterinary techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### 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.

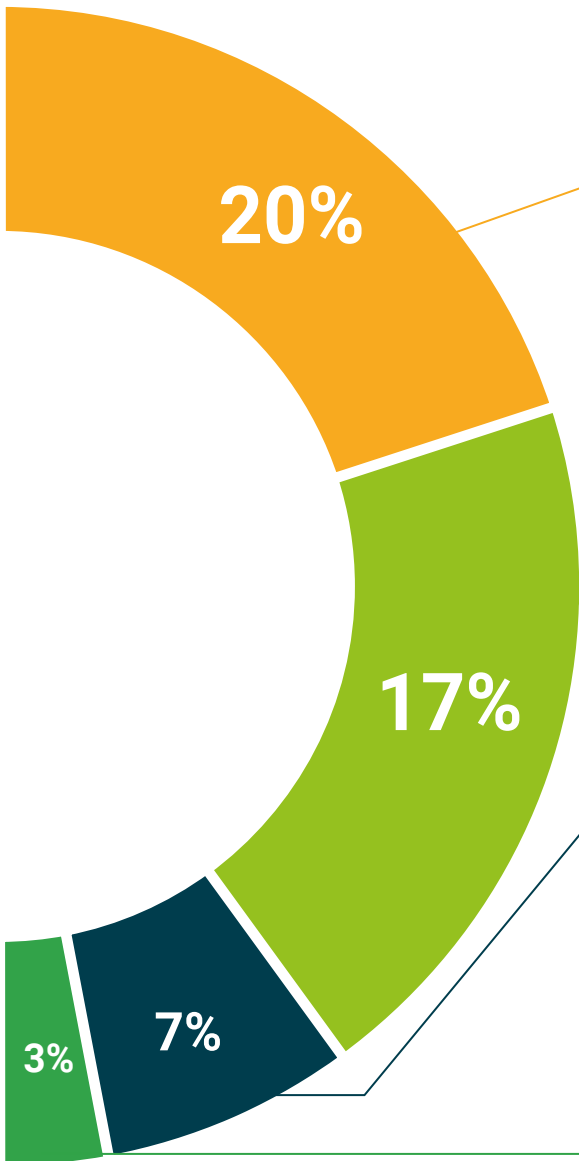
This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### 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, TECH presents real cases in which the expert will guide students, 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 suggesting that observing third-party experts can be useful.

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.



07

# Certificate

The Professional Master's Degree in Veterinary Cardiology in Small Animals guarantees you, in addition to the most rigorous and up-to-date training, access to a certificate issued by TECH Technological University.



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*Successfully complete this training program  
and receive your university certificate without  
travel or laborious paperwork"*

This **Professional Master's Degree in Veterinary Cardiology in Small Animals** contains the most complete and up-to-date scientific program scientific the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery\*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations and professional career evaluation committees.

Title: **Professional Master's Degree in Veterinary Cardiology in Small Animals**

Official N° of Hours: **1,500 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  
online training  
development language  
classroom



## Professional Master's Degree

Veterinary Cardiology  
in Small Animals

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Professional Master's Degree Veterinary Cardiology in Small Animals

