

**Pathology**

Code: 102676  
ECTS Credits: 6

| Degree                      | Type | Year | Semester |
|-----------------------------|------|------|----------|
| 2502445 Veterinary Medicine | OB   | 2    | 2        |

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: No  
Some groups entirely in Spanish: No

**Other comments on languages**

Catalan and Spanish are employed 50% each

**Teachers**

Rafaela Cuenca Valera  
María Dolores Fondevila Palau  
Martí Pumarola Batlle

**Prerequisites**

In order to take this subject, it is recommended that you should previously have studied the following subjects: Morphology I and Morphology II, Structure and Function of the Nervous System and finally, Physiology.

**Objectives and Contextualisation**

Pathology is a subject that introduces the student for the first time in the study of the disease. The different types of organic, tissue and cellular lesions are studied, as well as the genesis, causes and consequences for the animals of the functional disorders of the organs.

On successfully completing this subject, students will be able to recognize macroscopic and microscopic lesions: cellular pathology, cellular and pathological tissue deposits, circulatory disorders (discíclias), inflammation and mechanisms of repair and neoplastic growth; to know the causes and the consequences of the injuries; to understand the different types of injuries (basis for the study of diseases in each species) and the pathogenic mechanisms (basis for the correct understanding and interpretation of the different types of diseases); to use the specific terminology of each type of lesion for each organ and tissue correctly and the criteria used to name, classify and order the diseases.

This subject also provides students with a grounding in concepts as health, abnormality and illness; the description of the disease, in all its aspects, from its beginning to its completion and the causes, the genesis, the consequences on the organism of the functional disorders.

Learning outcomes. At the end of this subject, students should be able to:

- Describe the different types of injuries: concept, mechanism of production and clinical consequences
- Have a basic overview of the pathophysiological mechanisms of the disease
- Solve problems once analyzed and synthesized
- Communicate information with the use of appropriate medical terminology fluently, orally and in writing, to both specialized and non-specialized public

## Competences

- Analyse, synthesise and resolve problems and make decisions.
- Comunicar la informació obtinguda durant l'exercici professional de manera fluïda, oralment i per escrit, amb altres col·legues, autoritats i la societat en general.
- Demonstrate knowledge and understanding of structural and functional disorders of the animal organism.

## Learning Outcomes

1. Analyse, synthesise and resolve problems and make decisions.
2. Communicate information obtained during professional exercise in a fluid manner, orally and in writing, with other colleagues, authorities and society in general.
3. Describe the different types of injuries: concept, production mechanism and clinical consequences.
4. Explain the concepts of health, abnormality and illness.
5. Identify the physical, chemical and molecular bases of the pathophysiology of the animal organism.
6. Macroscopically and microscopically recognise types of injuries.

## Content

This subject is structured into the following two sections

SECTION 1 - GENERAL PATHOLOGY and SECTION 2 - NOSOLOGY and PHYSIOPATHOLOGY

SECTION 1 - GENERAL PATHOLOGY

### 1. Cellular pathology

The normal cell, the adapted cell and the dead cell: morphological characteristics.

Apoptosis.

Degeneration and cell death: hypoxia and oxygen free radicals.

Necrosis and death of the individual.

The necrosis of the tissues: characteristics and evolution. Types of necrosis.

### 2. Pathological cellular and tissue deposits

Deposit disease concept.

Pathological deposits of lipids and proteins. Lipidosis and amyloidosis.

Pathological pigmentations: Deposits of endogenous pigments: melanin, lipofuscin and pigments derived from hemoglobin. Deposits of exogenous pigments.

Deposits of crystalline and mineral material: pathological mineralization. Lithiasis.

### **3. Circulatory disorders (disciclies)**

Hyperemia - Congestion: concept, types and morphological aspects.

Edema: concept, pathogenesis and morphological aspects.

Hemorrhage: concept of hemostasis. Mechanisms: platelets, endothelium and coagulation cascade..

Thrombosis: morphology and pathogenesis. Embolism. Infarct.

### **4. Inflammation and repair mechanisms**

Inflammation: general concepts

Acute inflammation: hemodynamic and vascular permeability changes. Cell changes. Cells involved in the inflammatory response: characteristics and functions.

Mediators of Inflammation: characteristics and functions.

Chronic inflammation: definition and characteristics. Granulomatous inflammations. Mechanisms of regeneration and healing.

### **5. Neoplastic growth**

General characteristics of neoplastic growth: definition and nomenclature.

Characteristics of benign and malignant neoplasms. Differentiation versus anaplasia

Macroscopic and microscopic characteristics.

Molecular bases of neoplastic growth: oncogenes and suppressor genes. Genes of the cell cycle and apoptosis. Telomeres.

Etiopathogenesis of malignancy: physical, chemical and biological agents (virus)

## **SECTION 2 - NOSOLOGÍA and PHYSIOPATHOLOGY**

### **1. Nosología**

Nosonomía

Nosography

Nosognóstica

Noxotaxia

### **2. Concepts**

Pathology, Medicine and Clinic

General Pathology

Evolution of Animal Medicine and Clinic

### **3. Pathophysiology of the Digestive System**

Prehension, chewing, salivary secretion and swallowing

Stomach of monogastric animals. Vomiting

Stomach of ruminants. Indigestion syndrome

Diarrhea syndrome. Intestinal stenosis and ileus

Liver. Liver failure

Pancreas. Pancreatic Insufficiency

### **4. Pathophysiology of Respiratory System**

Cough and dyspnea

Respiratory insufficiency

### **5. Physiopathology of the Circulatory Apparatus**

- Heart failure
- Arrhythmias and valvulopathies
- Shock

### **6. Pathophysiology of the Blood and Hematopoietic Organs**

Red Blood Cells

White Blood Cells

Hemostasis and coagulation

### **7. Physiopathology of the Urinary System**

- Diuresis and urination
- Renal insufficiency

### **8. Physiopathology of the Nervous System**

• Síntomas neurológicos

### **9. Physiopathology of the Endocrine System**

Generic pathophysiology of the endocrine glands

Hypothalamus-pituitary system

Thyroid and parathyroid glands

Adrenals glands

Endocrine pancreas

## Methodology

To achieve the established objectives, this subject mainly involves the following methodology:

### Attendance-based

Theoretical classes (Sections 1 and 2): these sessions will be devoted to the presentation of theoretical most relevant aspects of the subject.

Practical classes (Section 1): practical classes are complementary to theoretical ones. These sessions are performed with small groups and, by means of histological preparations, each of the lesions in the microscope is studied.

### Autonomous work

Through self-learning work (Sections 1 and 2) the students will solve problems of clinical interest applying the knowledge worked.

Students must inform themselves of the news and information published on the Virtual Campus/ Moodle.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Activities

| Title                    | Hours | ECTS | Learning Outcomes |
|--------------------------|-------|------|-------------------|
| Type: Directed           |       |      |                   |
| Attendance-based         | 1     | 0.04 | 1, 2, 3, 4, 5, 6  |
| Lab practice             | 14    | 0.56 | 1, 2, 3, 4, 6     |
| Theoretical classes      | 39    | 1.56 | 3, 4, 5, 6        |
| Type: Supervised         |       |      |                   |
| Tutorial self - learning | 14    | 0.56 | 1, 2, 3, 4, 5, 6  |
| Type: Autonomous         |       |      |                   |
| Autonomus Work           | 79    | 3.16 | 1, 3, 4, 5, 6     |

## Assessment

To achieve the established objectives, this subject mainly involves the following methodology:

Assessment is continuous. Students must provide evidence of their progress by completing tasks and tests. Task deadlines will be indicated in the course Schedule on the first day of class.

Assessment Section 1 \*- It corresponds to 65% of the total of the final grade of the subject

Assessment of the lab practices:

Attendance is mandatory.

There will be 3 individual tests at the end of each block (Deposits, Inflammation and Neoplasia) where each student must demonstrate that they have integrated and acquired theoretical and practical knowledge of the lesions studied.

They will be compulsory and must be approved in order to be able to attend the theoretical exam. The marks obtained will represent 10% of the final note of Section 1.

Seminar Self-learning work:

The student must prepare and solve 2 self-learning assignments, for subsequent submission and presentation in an oral test before the teacher. It will be mandatory to overcome it in order to attend the theoretical exam. The marks obtained will represent 10% of the final grade of Block 1.

Theoretical exam:

The exam consist of a multiple choice test. The evaluable contents will be all the theories and practices of Block 1 (Cell changes - Deposits - Disciclies, Inflammation and malignancies). Each of these three parts must be passed separately to approve.

Assessment Section 2 \*- It corresponds to 35% of the total of the final grade of the subject

Self-learning work:

The student must prepare and solve 1 self-learning assignment corresponding to Nosología, for subsequent submission to the teacher. The resolution will be made by the teacher, in public session, on the last day of class. The marks obtained will represent 5% of the final grade of Block 2.

Theoretical exam:

The exam consist of a multiple choice test. The evaluable contents will be all the theories of Physiopathology and Nosología of Block 2.

\* A minimum score of 5 points in 10 points will be required in each of the exams of each block to pass the subject.

The student who does not perform the examination of the two Sections will be considered suspended.

\*\* Students who have not passed the theoretical exam of any of the 2 Sections will have the possibility of recovering it during the exam period at the end of the semester.

### Reassessment

Students who have not passed the theoretical exam of any of the 2 Sections will have the possibility of recovering it during the exam period at the end of the semester. The reassessment of the theoretical contents of Sections 1 and 2 will be carried out in the manner indicated above at the beginning of this section.

## **Assessment Activities**

| Title                              | Weighting | Hours | ECTS | Learning Outcomes |
|------------------------------------|-----------|-------|------|-------------------|
| Individual histopathology controls | 6,5%      | 0     | 0    | 1, 2, 3, 6        |

|                              |       |     |      |               |
|------------------------------|-------|-----|------|---------------|
| Self-learning work           | 11,5% | 0   | 0    | 2, 3, 5       |
| Theoretical exam - Section 1 | 52%   | 1.5 | 0.06 | 1, 2, 3, 5    |
| Theoretical exam - Section 2 | 30%   | 1.5 | 0.06 | 1, 2, 3, 4, 5 |

## Bibliography

### Section 1 - Pathology

- KUMAR V and ABBAS A (2015). Robbins y Cotran. Patología Estructural y Funcional, 9th ed. Elsevier, Madrid
- KUMAR; ABBAS & ASTER (2017) Robbins. Basic Pathology 10th ed. Elsevier, Madrid
- ZACHARY JF (2017). Pathologic Basis of Veterinary Disease, 6th ed. Elsevier, St Louis

### Section 2 - Nosologia and Physiopathology

- Dunlop, R.H. y Malbert, Ch-H. (2004). Veterinary Pathophysiology. Blackwell Publishing, Iowa, USA.
- McPhee, S.J. and Hammer, D. G. (2018). Pathophysiology of Disease. An introduction to clinical Medicine. 8th edition. Lange.
- Sjaastad, O; Sand, O. And Hove, K. (2010). Physiology of Domestic Animals. 2nd ed. Scandinavian Veterinary Press.
- BSAVA Manuals series:
  - Manual of Canine and Gastroenterology , 2nd ed. (2005)
  - Manual of Canine and Feline Nephrology and Urology, (2017)
  - Manual of Small Animal Clinical Pathology, (1998)
  - Manual of Canine and Feline Cardiorespiratory Medicine, 2nd ed. (2010)
- Ettinger, S. J.; Feldman, E. C. and Cote, E. (2017). Textbook of Veterinary Internal Medicine. 8th ed, Elsevier.

## Software

Not necessary any special software.