



Universitat de Lleida

DEGREE CURRICULUM  
**ANIMAL ANATOMY I**

Coordination: GARCIA ISPIERTO, IRINA

Academic year 2020-21

## Subject's general information

<b>Subject name</b>	ANIMAL ANATOMY I			
<b>Code</b>	100302			
<b>Semester</b>	1st Q(SEMESTER) CONTINUED EVALUATION			
<b>Typology</b>	Degree	Course	Character	Modality
	Double bachelor's degree: Bachelor's Degree in Veterinary Medicine and Bachelor's Degree in Science and Production	1	COMMON	Attendance- based
<b>Course number of credits (ECTS)</b>	6			
<b>Type of activity, credits, and groups</b>	<b>Activity type</b>	PRALAB	PRAULA	TEORIA
	<b>Number of credits</b>	1.6	1	3.4
	<b>Number of groups</b>	6	4	1
<b>Coordination</b>	GARCIA ISPIERTO, IRINA			
<b>Department</b>	ANIMAL HUSBANDRY			
<b>Teaching load distribution between lectures and independent student work</b>	Hores presencials: 60 Hores no presencials: 90			
<b>Important information on data processing</b>	Consult <a href="#">this link</a> for more information.			
<b>Language</b>	Català: 50% Castellà: 50%			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
GARCIA ISPIERTO, IRINA	irina.garcia@udl.cat	3,4	
GARCIA JIMENEZ, RUTH	ruth.garcia@udl.cat	1,2	
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SERRANO PÉREZ, BEATRIZ	beatriz.serrano@udl.cat	4,4	

## Subject's extra information

Some outdoor practices are included.

Lessons can be virtual or semivirtual due to the worldwide COVID 19

## Learning objectives

### Knowledge objectives

To know the formation of spermatozoa and ovocyte, cleavage, embryo and fetus.

To know and understand the embryonic development of the systems, in order to be able to understand the origin of certain congenital anomalies. Placentation.

To know the postnatal changes of the systems, as well as their topography in the adult animal.

To understand the relationships of the organs in the thoracic, abdominal and pelvic cavity.

To know the structure of cells and tissues as well as their organization for the formation of organs, apparatus and systems in the animal.

To identify cells, tissues and organs in histological preparations.

Comparative general osteology

### Capacity objectives

The student who passes the subject must be able to use the knowledge previously indicated in the study of other related subjects. He/she will know how to use the anatomical and histological terminology correctly and will know how to access and use autonomously embryological and anatomical information sources. He/she will know to handle and properly use the light microscope to study histological preparations. He/she will begin to master different histological and laboratory techniques, as well as dissection techniques. He/she will recognize the bones and their parts of the main domestic animals

## Competences

### Strategic competences of the University of Lleida

foreign language

Respect and development of Human Rights, democratic principles, the principles of equality between women and men, and the values of a culture of peace and other democratic values.

### Transversal competences of the degree

Interpret studies, reports, data and analyze them numerically.

Work alone and in a multidisciplinary team.

Understand and express yourself with the proper terminology.

Discuss and argue in various debates.

Analyze and assess the social and ethical implications of professional activity.

Have a critical and innovative spirit.

### Veterinary specific competences

Know the structure and function of healthy animals and the relationship between them

Being able to recognize the different tissues, organs, devices and systems of the animals

Apply knowledge of animal anatomy in the development of professional activity

Understand embryology to apply it to the understanding of the complex morphology of the adult animal

Topography in different domestic animals

General histology

Comparative Osteology

### CPA specific competences

CE4 Know the structure of the eukaryotic cell, its organization, topography and its structure in tissues, organs and systems as well as identify the operation and regulation of apparatus and body systems

CE6 Identify and know the ontogenetic development, anomalies congenital and embryology applications

## Subject contents

## Theory

General embryology, histology and topography of organs.

Themes:

1. Animal body: its parts and regions. Definition of organs and systems. Anatomical position. Anatomical terminology

General Embryology:

2. Meaning of embryology: Ontogeny development: definition and periods

3.- Spermatozoa structure

4.- Oocyte structure. Types of oocytes. Birds oocytes.

5.- Fecundation. Capacitation of spermatozoa. Mechanisms of approximation to oocyte. Activation of the oocyte. Parthenogenesis. polyspermy.

6.- Germinal period. Segmentation. Morula. Blastocyst. Hatching

7.- Gastrulation. Mechanisms of formation of the 3 germinative layers

8.- Embryonic or organogenetic period. Differentiation of the germinative layers: neurulation and formation of the primary organs.

9.- Biological processes that take place during ontogenetic development: Cell determination and differentiation, growth, cell migration and morphogenetic movements, adhesion and cellular affinity, apoptosis.

10.- Control and regulation of ontogenetic development: development in mosaic and by regulation, potential and prospective significance, embryonic induction and competence, positional information and morphogenetic gradients.

11.- Embryonic nidation. Extraembryonic attachments: Amnios, allantois, yolk sack and chorion. Comparative anatomy.

12- Placentation. Anatomical and histological classification of placentas. Biology of the placenta: Placental barrier, placental circulation, placental secretion and deciding.

14.- Fetal period. Fetal growth Stages of fetal development and estimation of age in the main domestic mammals (0.5 h)

Histology

16. Basis of histology: Concept of histology. Basic tissues. Histofisiology. Histological techniques of cells and tissues

17. Epithelial tissue. Generalities, concepts and types. Epithelial lining and glands.

18. Conective tissue. Generalities, concepts and components. Varieties of conective tissue. Cartilaginous and bone tissue

18. Muscle tissue. Generalities, concepts and types. Smooth muscle tissue. Skeletal muscle tissue. Cardiac muscle tissue.

19. Nervous tissue. Generalities, concepts and cell types. Central and peripheral nervous tissue.

Block 3. Topography and general orthogenesis of organs

Part 1. Ontogeny

21. Ontogeny of the heart. Postnatal changes

22. Development of the intraembryonic circulatory system. Arterial and venous systems: aortic arches, dorsal aortas, cardinal, supracardinal and subcardinal veins. Circulatory changes at birth. Congenital anomalies

23. Primitive bowel. Development and parts: Intestines anterior, middle and posterior. Celoma and derived cavities. Derivatives of the cranial portion of the anterior intestine: pharyngeal pouches. Congenital anomalies

24. Development of the caudal portion of the anterior intestine: tracheobronchial outline. (1 hour)

25. Branchial arches. Development of the thyroid gland Facial development Oral and nasal cavities, palate and choanas. Congenital anomalies

26. Derivatives of the middle and posterior intestines. Congenital abnormalities of the intestine. Small intestine: duodenum, jejunum and ileum.

27. Development of the urinary system: pronephros, mesonephros and metanephros; urinary tract. Congenital malformations.

28. Development of the gonads and genital ducts. Undifferentiated period and evolution in the male and female. Congenital malformations.

29. Development of the external genitalia of the male and female. Testicular descent mechanics

30. Embryology of the mammary gland. Comparative anatomy. Congenital malformations

31. Morphogenesis of the spinal cord. Metamerism Growth of the spinal cord and the vertebral canal. Congenital malformations.

32. Morphogenesis of the encephalon: stages of three and five vesicles. Development of the diencephalon and telencephalon, mesencephalon and rhombencephalon. Congenital malformations

Part 2. Postnatal changes and topography in the adult animal

33. Cambios postnatales de los aparatos y sistemas.

## Osteology

1. Introduction: ossification, bone types

2. Axial skeleton

3. Thoracic member

4. Pelvic member

## Practices

Histology block

Muscle tissue

Connective and epithelial tissue

Nervous tissue

Cartilaginous and bony tissue under the microscope

Embryology block (dissection room / classroom)

Morphology of the male reproductive system . Study of the route of sperm during spermatogenesis. Testicles Tunics, external morphology and study of structures in longitudinal sections. Spermatid cord Accessory glands Penis and foreskin. Parts and external morphology. Comparative anatomy.

Morphology of the female reproductive system . Study of the place of fertilization and structure of the ovary. Ligaments and ovarian pouch. Identification of structures in longitudinal sections of the ovary. Uterine thrombus. Horns, body and neck of the uterus. Wide ligament. Vagina, vestibule, vulva and clitoris. Study of structures in longitudinal sections of the genital tract. Comparative anatomy

Self-assessment seminar

Osteology Block (Dissection room)

Scapula

Humerus, ulna, radius

carpus and phalanges

Ribs, vertebrae, sacrum

Hip and femur

Tibia, fibula, tarsus and helmet

The cranium will be studied in Animal Anatomy II

## Methodology

Lessons will take place in a weekly session of 3 to 5 hours, either theory or practice.

Material will be given in the form of diagrams or summaries of the different topics, as well as "links" of interest for self-study, through the electronic files of the ETSEA library.

Students will be scheduled to participate in the preparation and presentation of group work related to the subject.

After each practice there will be an exam. The practices will be carried out in small groups of 15 students (4-6 groups per course) in the anatomy or histology laboratory. As a general rule, the socratic tool or the VC test tool will be used

The rubric of the work will be added at VC in advance.

All exams will be corrected either virtually or presentially to give feedback to the student.

Due to current circumstances, lessons can be semi-presential (half the group in the classroom-half the group for videoconference) or if the situation requires it, virtual. The session will always be recorded so that the student can access to the lesson everytime.

The part of the oral embryology exam will be done using the VC videoconference tool. In this way and through a previous rubric, the note may be revised later. In practices, the safety distance will be maintained and the Covid-19 regulations will be strictly followed.

## Development plan

Theoretical lessons: part-time (half in the classroom, half by video conference) due to COVID-19

Osteology practical lessons: Dissection room-Animal

Practical histology lessons: Microscope room of the SHV building

The calendar posted by the director of studies will be strictly followed

## Evaluation

10% Small exams after each practical session

5% Exam after GREFACSA

8% Poster

20% Oral exam

Cumulative exams

14% Histology

18% General embryology

25% All course

## Bibliography

- Bacha W, Wood L. Atlas color de histología veterinaria. Ed. Inter-medica. 1991
- Banks WJ. Histología veterinaria aplicada. Mexico: Ed El Manual Moderno 1986.
- Clayton HM, Flood PF. Large animal applied anatomy. Mosby-wolfe. 1996
- CLIMENT, S. y J.A. BASCUAS (1989): Cuadernos de Anatomía y Embriología Veterinaria. (1, 2, 3, 4, 5 y 6). Ed. Marbán, Madrid.
- EURELL I FRAPPIER (2006). Dellmann's textbook of Veterinary Histology. 6<sup>th</sup> ed. Blackwell.
- DYCE, K.M., W.O. SACK y C.J.G. WENSING (1999): Anatomía veterinaria. Ed. McGrawHill Interamericana.
- GIL CANO, F y cols. (1998) Osteología Veterinaria. Diego Marin, Murcia.
- GILBERT, SF (2005) Biología del desarrollo (7<sup>a</sup> ed) Ed. Médica Panamericana
- Frandson RD. Anatomía y fisiología de los animales domésticos. 3<sup>a</sup> Ed. Mexico: Ed Interamericana 1984.
- NICKEL, R., A. SCHUMMER y E. SEIFERLE (1986): The Anatomy of the Domestic Mammals. Vol. 1: The locomotor system of the domestic animals. Paul Parey, Berlin.
- KIERSZENBAUM AL. TRES LL. 2012. Histología y Biología Celular. Introducción a la Anatomía Patológica. 3<sup>a</sup> Edición. Elsevier Saunders.
- KÖNIG HE, LIEBICH HG (2004): Anatomía de los animales domésticos-Tomo 1: Aparato Locomotor. Ed. Médica Panamericana.
- McLelland J. Anatomía de las aves. Ed. Interamericana. 1992
- NODEN, D.M. y A. DE LAHUNTA (1990): Embriología de los animales domésticos. Ed. Acribia, Zaragoza.
- SCHALLER, O. (1996): Nomenclatura anatómica veterinaria ilustrada. Ed. Acribia S.A., Zaragoza.

- WELSCH, U. Sobotta. Histología (recursos electrónico). 3ª ed. Panamericana (2014).
- WHEATHER. Histología funcional: texto y atlas en color (2014). - 6º ed. / Barbara Young, Geraldine O'Dowd, Phillip Woodford. Elsevier.