



Universitat de Lleida

DEGREE CURRICULUM **ANIMAL PHYSIOLOGY**

Coordination: JOVE FONT, MARIONA

Academic year 2023-24

Subject's general information

Subject name	ANIMAL PHYSIOLOGY			
Code	101616			
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION			
Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Biotechnology	2	COMPULSORY	Attendance-based
Course number of credits (ECTS)	6			
Type of activity, credits, and groups	Activity type	PRAULA		TEORIA
	Number of credits	1.8		4.2
	Number of groups	2		1
Coordination	JOVE FONT, MARIONA			
Department	EXPERIMENTAL MEDICINE			
Important information on data processing	Consult this link for more information.			
Language	Catalan			

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
BOADA PALLAS, JORDI	jordi.boada@udl.cat	3,6	
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Subject's extra information

Due to the current health situation caused by the Covid-19 pandemic, most of the subject has been programmed in virtual format. However, depending on the evolution, this programming may be affected by either an increase in presence or virtuality.

Learning objectives

The student must be able to:

- Apply the general principles of physiology in the reasoning of vital phenomena, and use the appropriate terminology in relation to animal functions
- Acquire an integrated physiological knowledge of the cell to the individual
- Know the basic processes of cellular physiology, including the study of the main intercellular communication mechanisms
- Know the structure and function of different animal tissues
- Know the functional mechanisms of the cardiovascular system
- Know the functional mechanisms of the respiratory system
- Know the functional mechanisms of the excretory system
- Know the functional mechanisms of the digestive system
- Know the functional mechanisms of the reproductive system
- Know the regulation of the different organic systems in charge of 1) the Nervous System and 2) the Endocrine system

Competences

GC1 Being able to selectively search for and use sources of information necessary to achieve the training objectives.

GC2 Interpret scientific-technical information with a critical sense, and be able to make presentations based on this information.

GC3 Working in a team, with a multidisciplinary vision and with the ability to make a rational and efficient

distribution of tasks among team members.

GC4 Knowing and adequately using the scientific and technical vocabulary of the different areas of Biotechnology.

GC5 Working in the laboratory applying criteria of quality and good practice.

GC7 Using the scientific method to analyze data and design experimental strategies with biotechnological applications.

CE17 To know the essential metabolic processes of living beings and their regulation.

CE18 Acquire an integrated vision of cellular structures, relating them to their specific functions and the biochemical processes involved.

CE22 Acquire a precise knowledge of the basic principles and physiological mechanisms of animal and plant organisms.

CE25 To know the practice of microbial, animal and plant cell culture.

CT1 Being able to produce comprehensible written and oral reports on the work carried out, with a justification based on the theoretical-practical knowledge obtained.

CT3 To use information and communication tools and techniques for data analysis and the preparation of oral and written reports and other training and professional activities.

Subject contents

1. CELL PHYSIOLOGY

- a. Levels of organization
- b. Energy metabolism
- c. Transport and intercellular communication
- d. Homeostasis
- e. Volume and composition of body fluids.
- f. Cellular types and functions:
 - i. epithelial cells
 - ii. support cells and extracellular matrix
 - iii. contractile cells
 - iv. nerve cells
 - v. blood cells

2. GASTROINTESTINAL PHYSIOLOGY

- a. Structure of the digestive system.
- b. Innervation of the digestive system.
- c. Gastrointestinal Peptides
- d. Motility.
- e. Secretion.

F. Digestion and absorption.

g. Intestinal hydroelectric transport.

h. Physiology of the liver. Enterohepatic circulation.

3. RESPIRATORY PHYSIOLOGY

a. Structure of the respiratory system.

b. Lung volumes and capacities.

c. Breathing mechanics

d. Gas exchange

e. Transport of oxygen in the blood.

f. Transport of carbon dioxide in the blood.

g. Ventilation / perfusion relations.

h. Breath control

i. Integrative functions

4. CARDIOVASCULAR PHYSIOLOGY

a. Cardiovascular system circuit.

b. Hemodynamics

c. Cardiac electrophysiology.

d. Relations between cardiac output and venous return.

e. Regulation of blood pressure.

f. Microcirculation

g. Special circulations

h. Thermoregulation

i. Integrative functions of the cardiovascular system.

j. Hypoxemia and hypoxia.

5. THE BLOOD

a. Main functions of blood, components and hematocrit concept.

b. Physical and chemical characteristics of plasma.

c. Cellular elements of the blood.

d. Hematopoiesis

e. Iron metabolism and hemoglobin.

f. Transport of oxygen and carbon dioxide through the blood.

g. Hemostasis

h. Blood groups.

6. RENAL PHYSIOLOGY

- a. Anatomy and blood supply.
- b. Body fluids
- c. Renal clearance.
- d. Renal blood flow.
- e. Glomerular filtration
- f. Reabsorption and secretion.
- g. Water balance: concentration and dilution of urine.

7. REPRODUCTIVE PHYSIOLOGY

- a. Sexual differentiation.
- b. Puberty.
- c. Male reproductive physiology.
- d. Female reproductive physiology.

8. ENDOCRINE PHYSIOLOGY

- a. Hormonal synthesis
- b. Regulation of hormonal secretion.
- c. Hypothalamus - pituitary relationships.
- d. Hormones of the anterior lobe of the pituitary gland.
- e. Hormones of the posterior lobe of the pituitary gland.
- F. Thyroid hormones
- g. Medulla and adrenal cortex.
- h. Endocrine pancreas
- i. Regulation of calcium and phosphate metabolism.

9. NEUROPHYSIOLOGY

- a. Organization and general characteristics of the autonomic nervous system.
- b. Autonomous receivers
- c. Organization of the nervous system.
- d. General characteristics of sensory and motor systems.
- e. Sensory systems.
- f. Somatosensory system and pain.
- g. Motor systems
- h. Superior functions of the nervous system.

Methodology

The course is divided into the following activities:

1. Master Class (large group): Explanation of the main concepts of Human Physiology
2. Problems and cases (large group): Problem solving. They pose physiological problems that the student must solve individually and then discuss together.
3. Simulation practices (middle group): Consolidate the concepts taught in the lectures through computer simulation practices. The student must complete the practice and write a report.
4. Group work: Explain a previously chosen physiological topic and explain the consequences of disruption of homeostasis in the studied system.

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Development plan

The lectures will be interwoven with solving problems of the theoretical topic being taught. The simulation practices will always be done after having given the syllabus to the lectures. Group work will be presented during the last two weeks of the subject

Evaluation

Theoretical part: 70% of the final grade, evaluated in two partial exams during the course.

A minimum of 4 is required in each partial exam to pass the subject.

If the grade of each partial is equal to or greater than 4, the average grade will be calculated as follows: $\text{average grade} = (\text{first partial} + \text{second partial}) / 2$.

To pass the subject, the average grade of the theoretical part must be equal to or greater than 5. Only in this case will the seminar and work notes be added.

Practices: 15% of the final grade, assessed in an exam. Attendance at practices is mandatory

Teamwork: 15% of the final grade, assessed in a job and oral presentation.

Bibliography

- Animal Physiology. Hill, Wyse & Anderson. Sinauer. 20th edition
- Principios de Fisiología Animal. Moyes and Schulte. Pearson, 1a edición
- Fisiología. Berne y Levy. Elsevier, 6a edición
- Fisiología Humana. Fox. Mc Graw-Hill, 10a edición
- Introducción al Cuerpo Humano. Tortora & Derrickson. Panamericana. 4a edición
- Anatomy and Physiology. Jenkins & Tortora. Wiley, 20th edition