

## Endocrinology

Code: 100860  
ECTS Credits: 6

2025/2026

Degree	Type	Year
Biochemistry	OP	4

### Contact

Name: Juan Hidalgo Pareja

Email: [juan.hidalgo@uab.cat](mailto:juan.hidalgo@uab.cat)

### Teachers

Francisco Javier Carrasco Trancoso

Elisenda Sanz Iglesias

Gemma Comes Orpinell

### Teaching groups languages

You can view this information at the [end](#) of this document.

### Prerequisites

To have passed the subject of Animal Physiology, as well as of Cell Biology and Biochemistry

### Objectives and Contextualisation

The subject "Endocrinology" is an option of the last course in Biology and Biochemistry, so that the student already has a high level of basic knowledge of biology, which will allow to deepen in this matter.

The subject does not structure to the classic mode of "Hormone A, functions B and C", but will analyze several relevant biological aspects in which endocrine / neuroendocrine factors participate. The idea is to give an integrated vision of critical factors in the survival of the individual and of the species: rhythms, stress, growth and longevity, weight control, sexual and maternal behavior. As far as possible we will proceed to the analysis of animal models that help us to understand the human species.

In the classes, articles and scientific reviews of reference journals will be used as much as possible (Nature, Science, Cell, etc.) rather than textbooks. Documentation will be prepared that will be provided beforehand to the student with the fundamental information, indicating the original reference of the publication in case the student needs clarification and wishes to consult it (it will not be indispensable but it will also benefit the student from the point of view of the domain of the English). The idea is that the student has to complement that basic information with the work in class, acquiring an important method of work.

## Learning Outcomes

1. CM13 (Competence) Propose innovative solutions to restore normal physiological processes in pathological situations.
2. CM14 (Competence) Interpret experimental results regarding physiological processes at the molecular level in animals and plants, with particular emphasis on the nervous and endocrine systems.
3. KM19 (Knowledge) Describe the different cell types present in animals and plants at a structural, physiological and biochemical level.
4. KM20 (Knowledge) Identify the biochemical and genetic changes associated with various pathologies, as well as any molecular or physiological alterations that they cause.
5. SM15 (Skill) Analyse the role of hormones, neurotransmitters, and growth factors in the regulation of gene expression and metabolism.
6. SM16 (Skill) Interpret experimental results from studies of molecular-level physiological processes.

## Content

After the basic concepts of the previous basic subject (Animal Physiology), Endocrinology will proceed to deepen the various endocrine axes, particularly at the neuroendocrine level, its relationship with behavior, and trying to maintain a vision integrated into the major themes:

1. Introduction. General organization of the nervous and endocrine system; local factors.

Hypothalamic-pituitary relationship. Hypothalamic survival circuits: hunger, thirst, sex ... Action programmes (motivations, emotions) & feelings: ancestral mechanisms; vasopressin and oxytocin as examples.

2- Circadian rhythm, ancestral mechanism. Suprachiasmatic nucleus. Clock genes. Use of light as a synchronizing mechanism & other possible synchronizers. Living against our circadian rhythm has a cost. Seasonal rhythms & melatonin. Other rhythms

3- Stress and some of its consequences. Anticipatory and reactive pathways control the hypothalamus-pituitary-adrenal axis. MR and GR receptors. Cushing disease & glucocorticoids. Stress & fear & anxiety & depression: interactions with the Immune System, and an example of the importance of epigenetics. Epigenetic intergenerational and transgenerational inheritance.

4- Obesity, the new epidemic?. Body weight control: much more than an aesthetic issue. Diets, drugs and surgical procedures (and their failures & potential hazards). Main factors and pathways involved. Homeostatic & hedonic systems. Body mass index, fat deposits & genome-wide association studies (GWAs) & its limitations. "Battle of the sexes" & genomic imprinting. Obesity & inflammation. Obesity & microbiome.

5- Growth: Heritability and susceptibility. GWAs. Growth & development. Endocrine control of growth. Psychosocial dwarfism & stress. Hypothalamus-pituitary-somatic axis: GH, IGF-I&II.

6- Growth vs. longevity: it was not so simple. Size of the species & longevity: strict or flexible law?. Caloric and/or food intake restriction: apparent relationship with morbidity & longevity. Senescence, telomeres, oxidative stress, mitochondrial DNA, p53 & longevity. mTOR, rapamycin & other "anti-aging pills". What (probably) announces the experiments of parabiosis between old and young animals. Epigenetic clock & longevity.

7- Genetic, gonadal and phenotypic sex. Dmrt1, SRY and other critical factors in sexual determination and differentiation. Gonadal sex is not irreversible. Compensation of the gene dose of the sex chromosomes. XIC: X inactivation center. Somatic sexual identity in mammals?. Internal and external genitalia: main hormones involved. Intersexual states: congenital adrenal hyperplasia & Prader classification.

8- Hypothalamus-pituitary-gonadal axis: integral control of vertebrate reproduction. Importance of the control of GnRH neurons: pulse generator versus preovulatory peak. Sex steroids, kisspeptin & other factors involved. Puberty: everything changes. Menarche & context & kisspeptin & limitations of the GWAs. Puberty & risk behaviors.

9- Sexual differentiation of behavior: Battle of the sexes?. Sexual dimorphism: what does it reveal? Sexual selection: the omission of Darwin. The Coolidge effect. Sex drive and performance. Sexual steroids & oxytocin. Proceptivity & receptivity. Relevance of the hypothalamus.

10- Violence: a major problem. Is there a link between sex and violence?. Lethal aggression intra-species: we are not the only ones. Relevance of the hypothalamus. Infanticide & males and paternity dilution. Infanticide & females. Monogamy vs polygamy in mammals. Social vs sexual monogamy. Oxytocin & vasopressin & dopamine: pair bonding and other social behaviors.

11- Attractivity (body & facial): what is it and what does it reveal? Main characteristics and factors involved. Some considerations about pheromones & MHC in mammals.

12- Sexual orientation & gender. CNS Organization and activation by sexual steroids in animal models. Default sex & masculinization & defeminization: beware of analgesics. Evidence in humans and possible biological bases.

## Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practices	12	0.48	CM14, KM20, SM15, SM16, CM14
Seminars	4	0.16	CM13, CM14, KM19, KM20, SM15, SM16, CM13
Theoretical classes	35	1.4	CM13, CM14, KM19, KM20, SM15, SM16, CM13
Type: Supervised			
Preparation of seminars	6	0.24	CM13, CM14, KM19, KM20, SM15, SM16, CM13
Type: Autonomous			
Elaboration of works related to the classroom	14	0.56	CM13, CM14, KM19, KM20, SM15, SM16, CM13
Time dedicated to studying	65	2.6	CM13, CM14, KM19, KM20, SM15, SM16, CM13

The formative activities are composed of:

- (a) theoretical classes, with the usual format of master class supported by images usually obtained from scientific articles. Much of this material will be available to the student on the virtual campus
- (b) practices, in which the levels of cortisol in skin and saliva are analyzed
- (c) seminars, where, as far as possible, functional tests will be carried out with the students

These activities must necessarily be complemented by other supervised and autonomous ones.

Use of AI.

For this subject, the use of Artificial Intelligence (AI) technologies is allowed exclusively in support tasks, such as bibliographic or information searches, text correction or translations. The student must clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how these have influenced the process and the final result of the activity. The lack of transparency of the use of AI in this assessable activity will be considered a lack of academic honesty and may lead to a partial or total penalty in the grade of the activity, or greater sanctions in serious cases.

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.

## Assessment

### Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Practices	10%	4	0.16	CM13, CM14, KM20, SM15, SM16
Seminars	10%	4	0.16	CM13, CM14, KM19, KM20, SM15, SM16
Theoretical exam	80%	6	0.24	CM13, CM14, KM19, KM20, SM15, SM16

The continuous evaluation process includes four evaluation activities, of three different types, distributed through

Partial theory 1: 40% (depending on the course schedule could be higher or lower but never more than 50%)

Partial theory 2: 40% (depending on the course schedule could be higher or lower but never more than 50%)

Practices: 10%

Seminars: 10%

The theory exam will be test type, with 4 possible answers being just one correct, and using the soft penalty in the

The practices will be valued by a test type exam. The seminars will be as

Attendance at practical sessions is mandatory; students will obtain the "Non-evaluable" qualification when the ab

A system for recovering the evaluation of the subject is contemplated, ex

To participate in the recovery exam, the students must have previously been evaluated in a set of activities whos

The theoretical knowledge will be evaluated by two partial exams. The student must obtain at least 4,5 if he/she v

If both partials exceed 4,5 but do not reach the average 5, the student will be able to choose the partial exam to re

Single assessment.

The single assessment consists of a single synthesis test in which the contents of the entire theoretical program of the subject will be evaluated. The test will consist of multiple-choice questions, like those of continuing education. The grade obtained in this synthesis test will account for 80% of the final grade of the subject.

The evaluation of the practical activities (10%), and the classroom practices (10%) will follow the same process as the continuous assessment.

The delivery of evidence of the practical activities and classroom practices will follow the same procedure as in the continuous assessment.

The single assessment test will be held on the same date set in the calendar for the last continuous assessment test and the same recovery system will be applied as for continuous assessment. The review of the final grade follows the same procedure as for continuous assessment. The same non-assessable criterion will be applied as for continuous assessment.

## **Bibliography**

Reviews and articles selected with electronic access. Main Journals:

Physiological Reviews: <https://journals.physiology.org/journal/physrev>

Endocrine Reviews: <https://academic.oup.com/edrv>

Annual Review of Physiology: <https://www.annualreviews.org/journal/physiol>

Nature: <https://www.nature.com/>

Nature Reviews Endocrinology: <https://www.nature.com/nrendo/>

Nature Reviews Genetics: <https://www.nature.com/nrg/>

Nature Reviews Immunology: <https://www.nature.com/nri/>

Nature Reviews Molecular Cell Biology: <https://www.nature.com/nrm/>

Nature Reviews Neuroscience: <https://www.nature.com/nrn/>

Nature Medicine: <https://www.nature.com/nm/>

Science: <https://www.sciencemag.org/>

Cell: <https://www.cell.com/>

Current Biology: <https://www.cell.com/current-biology/home>

Cell Metabolism: <https://www.cell.com/cell-metabolism/home>

Proceedings of the National Academy of Sciences of USA: <https://www.pnas.org/>

The Lancet: <https://www.thelancet.com/>

Neuron: <https://www.cell.com/neuron/home>

The New England Journal of Medicine: <https://www.nejm.org/>

## Software

Not used

## Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	141	Catalan	second semester	morning-mixed
(PAUL) Classroom practices	142	Catalan	second semester	morning-mixed
(PLAB) Practical laboratories	141	Catalan	second semester	afternoon
(PLAB) Practical laboratories	142	Catalan/Spanish	second semester	afternoon
(PLAB) Practical laboratories	143	Catalan/Spanish	second semester	afternoon
(TE) Theory	14	Spanish	second semester	morning-mixed