COURSE DATA

Data Subject	
Code	33064
Name	Endocrinology and reproduction
Cycle	Grade
ECTS Credits	5.0
Academic year	2017 - 2018

Study (s)

Degree	Center	Acad. year	Period
1100 - Degree in Biology	Faculty of Biological Sciences	4	First term

Subject-matter

Degree	Subject-matter	Character
1100 - Degree in Biology	16 - Fundamentals of health biology	Optional

Coordination

Name	Department
LORENTE CARCHANO, MARIA JOSE	23 - Functional Biology and Physical Anthropology

SUMMARY

Endocrinology and Reproduction is a subject dealing with the hormonal mechanisms of regulation of homeostasis, development, growth and reproduction, while studying the reproductive process itself. It also addresses the analysis of the alterations of these processes and mechanisms, as well as therapeutic strategies and technology to solve them.

This is an optional subject belonging to the intensification Fundamentals of Health Biology (FBS), both theoretical and practical and is located in the first quarter of the fourth year, with subjects such as Clinical Biochemistry and Human Genetics. This course is complemented by clinical biochemistry that takes place in parallel, mainly in regard to certain diseases caused by alterations in the homeostasis of certain hormones.

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

Other requirements

The student must have passed 120 ECTS

OUTCOMES

1100 - Degree in Biology

- Conocer y saber aplicar el método científico.
- Capacidad de organización, planificación y gestión de la información usando bases de datos bibliográficas adecuadas.
- Utilización del vocabulario específico de la Biología sanitaria.
- Capacidad de resolución de problemas y toma de decisiones.
- Capacidad de elaborar artículos, informes o proyectos y de exponerlos a diferentes auditorios.
- Habilidad para el trabajo en equipo y en contextos multidisciplinares.
- Capacidad de análisis crítico de textos científicos.
- Aprendizaje autónomo y adaptación a nuevas situaciones.
- Potenciar la creatividad, iniciativa y espíritu emprendedor.
- Apreciación del rigor, el trabajo metódico, y la solidez de los resultados.
- Potenciación de la capacidad de liderazgo.
- Capacidad de utilización de herramientas matemáticas y estadísticas.
- Conocimiento de bases de legislación relacionada con la Biología.
- Saber analizar datos usando herramientas estadísticas apropiadas.
- Conocimiento de sistemas de gestión en tareas profesionales en Biología sanitaria.
- Conocer los principales métodos y técnicas experimentales aplicadas al estudio de las enfermedades humanas, su etiología y la efectividad de los tratamientos.
- Conocimiento de las enfermedades y disfunciones más frecuentes durante las distintas etapas de la vida.
- Conocer las bases biológicas de las disfunciones en la regulación hormonal y la estrategias para su tratamiento.
- Conocer la regulación endocrina de la función reproductiva y su modulación por factores externos.

- Entender los mecanismos de la producción gamética y del encuentro gamético, sus posibles alteraciones y los tratamientos de las mismas.
- Conocer los fundamentos de la tecnología de la reproducción humana y animal.

LEARNING OUTCOMES

• Gain an integrated view of animal performance, understanding the meaning of acquired knowledge, interrelate and apply.

• Be able to produce articles, reports or projects and exposing them to different auditoriums.

• Use proper mathematical and statistical tools.

• Capacity for speaking before a public audience, such as the class itself, through exposure or intervention in a debate on a controversial topic or issue.

• Professional development. Acquisition of scientific knowledge relating to reproductive endocrinology and facilitate the work in Assisted Reproduction.

DESCRIPTION OF CONTENTS

1. INTRODUCTION TO ENDOCRINOLOGY

UNIT 1. Background. General functioning of the hypothalamic-pituitary. Morphology of the hypothalamus and pituitary. Hypothalamic hormones. Neurohypophyseal hormones. Anterior pituitary hormones. Control of anterior pituitary hormone secretion by the hypothalamus. Neuroendocrine integration levels

2. HORMONAL REGULATION OF GENERAL FUNCTIONS

UNIT 2. Hormonal regulation of tissue differentiation and growth. Regulation of secretion of growth hormone. Functions of growth hormone. Organization of the thyroid gland. Synthesis, secretion, transport, mechanism of action and metabolism of thyroid hormones. Functions of thyroid hormones. Control of thyroid gland function. Pathologies associated with thyroid disorders.
UNIT 3. Regulation of calcium and phosphate homeostasis. Physiological functions of calcium and phosphate. Synthesis and regulation of secretion of parathyroid hormone, calcitonin, and 1,25-dihydroxycholecalciferol (vitamin D3). Effects of interaction between parathyroid hormone, calcitonin, and 1.25-dihidroxicole-calciferol in bone, intestine and kidney. Action of other hormones in the homeostasis of calcium and phosphate. Pathologies associated with disorders of calcium metabolism.
UNIT 4. Hormonal regulation of nutrient metabolism. Islets of Langerhans. Physiological role of pancreatic hormones. Androgens as anabolic protein. Pathologies associated with glucose metabolism. Role of gastrointestinal hormones.
UNIT 5. Adaptation to stress. Organization of the adrenal glands. Synthesis, release, transport and metabolism of corticosteroids and catecholamines. Effect of stress on metabolism, reproduction and immune system. Pharmacological actions of glucocorticoids. Regulation of secretion of catecholamines. Stress-related pathologies.

UNIT 6. Control of water and salt balance. The renin-angiotensin regulation of aldosterone secretion. Actions of the renin-angiotensin, aldosterone, vasopressin (ADH) and natriuretic peptides. Regulation of secretion of aldosterone and vasopressin. Pathologies associated with disorders of aldosterone secretion.

3. ENDOCRINOLOGY OF REPRODUCTIVE FUNCTION

UNIT 7. Endocrinology of sexual differentiation and development. Bipotential precursors of the gonads and. genitalia. Differentiation primary chromosomal or genetic sex of the gonads. Secondary sexual differentiation of the internal and external genitalia, central nervous system and psychosexual. Development of the reproductive functions, fetal period, neonatal, infant, juvenile, prepubertal and adolescents (puberty). Mammary gland development: embryonic, adolescent pregnancy and lactation. Pathologies associated with disorders of sex development.
UNIT 8. Regulation of testicular and ovarian function. Anatomy of male and female reproductive organs. Ovarian and testicular function: oogenesis, spermatogenesis and hormone synthesis. Control of ovarian and testicular function. The menstrual cycle. Associated pathologies.
UNIT 9. Mechanisms of sexual response. Reproductive behavior (phase of estrus or heat). Stages of male and female sexual response. Mechanisms of sexual response. Ejaculation. Effects of certain medications, diseases and conditions associated with male and female sexual dysfunction.
UNIT 10. Gamete and embryo transport. Sperm transport. Transportation of eggs and embryos. Endocrine and paracrine regulation gamete and embryo transport. Pathologies associated with gametic transport.
UNIT 11. Fertilization and implantation, pregnancy, childbirth and lactation. Fertilization, implantation and maternal-embryonic interactions. The placenta as an endocrine organ. Physiological adaptations during pregnancy. Physiology and endocrinology of parturition. Endocrinology of lactation. Associated pathologies.

4. BIRTH CONTROL, INFERTILITY, ASSISTED REPRODUCTION

UNIT 12. Birth control. Male and female contraception. Mechanisms of action and effects.
UNIT 13. Male and female infertility. Epidemiology of infertility. Causes of female infertility. Causes of male infertility. Recurrent early pregnancy loss. Effects of age on reproductive potential.
UNIT 14. Assisted reproduction techniques. Intrauterine insemination. In vitro fertilization (IVF). Embryo culture systems. Embryo transfer. Cryopreservation. Results and risks of IVF. Stem cells, cloning and transgenesis: applications in biomedicine and livestock.

5. PRACTICAL LABORATORY

- Role of ovarian steroids on the estrous cycle and sexual behavior. Morphological-functional study of the organs affected by ovariectomy.
- Effects of thyroid hormones on the differentiation and behavior. Morphological-functional study of the organs affected by the chemical thyroidectomy.
- Endocrine Control of glucose metabolism.
- Gamete and embryo quality. Techniques of assisted reproduction.

6. SEMINARS

This activity is the preparation, presentation and advocacy work on issues related to the subject.

7. TUTORIALS

This is an activity where students in groups will discuss, from the information provided by the teacher, on different aspects of a topic related to the subject.

WORKLOAD

ACTIVITY	Hours	% To be attended
Theory classes	26,00	100
Laboratory practices	22,00	100
Tutorials	2,00	100
Development of group work	20,00	0
Study and independent work	43,00	0
Preparing lectures	9,50	0
Preparation of practical classes and problem	2,50	0
TOTAL	**125,00**	

TEACHING METHODOLOGY

The following teaching methods will be used for activities of this course:

- *Theory classes*, type lectures to be taught sequentially over the first quarter, so that they are integrated with the rest of proposed activities.

- *Laboratory practical sessions*. After the reading of the practice dash previously available in Aula Virtual, the students perform the proposed practices with the assistance of the teachers.

- *Seminar*. Preparation, presentation and defense of employment related to the subject. You can be the extension of some part of the agenda, highlighting the interest among students, or a hot topic. It could be prepared by students or by expertise persons.

- *Tutorials*. Two one-hour sessions where students, in groups, will present and discuss on works about a previously proposed topic (article, reports, project sheet,...).

IMPORTANT NOTE: Virtual Classroom is considered the official notice board and via normal communication of information between teacher and students. Examination session, announcements about the schedule change, notification of grades and exam schedules will be announced review of the SSP and is student's responsibility to be aware of these communications and provide for the mailbox that the University provides under conditions suitable to receive the messages. Also asked the students in their email communications with teachers using e-mail account of the University and no other. Messages from other sources will be ignored.

EVALUATION

Evaluation of the knowledge of theory

Evaluation of the concepts worked in the theoretical sessions by performing, at the end of the semester, a test consisting of questions of medium-short length, on basic concepts and processes. The mark of this test represents 60% of the final course grade.

Assessment of practical skills

Laboratory work will be evaluated by an examination to be held together with the theory at the end of the semester. This test may contain short questions and problems or experimental questions on classroom practices. The mark obtained will represent **25% of the final grade for the course.**

Attendance at lab sessions is a prerequisite to pass the course (minimal attendance 4 sessions).

Evaluation of the seminar and tutorials

The evaluation of the Seminars and tutorial sessions will take into account the performed work, the presentation and the capacity of synthesis and integration of information of students, as well as the clarity and quality of discussion of contents and the active participation in the final session.

The mark obtained will represent **15% of the qualification of the course**.

Attendance will be controlled and compulsory.

A grade of approved, both in theory and practice, is required to pass the course and to get an overall rating equal to or greater than 5 out of 10.

Lab, seminar and tutorials qualifications at or above 5 (of 10), obtained during an academic year will be saved for the next academic year.

REFERENCES

Basic

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- Treguerres JAF. 2005. Fisiología Humana, 3era Edición. McGraw-Hill Interamericana, México.
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