Universitat Autònoma de Barcelona

2020/2021

Genetics

Code: 102674
ECTS Credits: 3

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: Yes
Some groups entirely in Spanish: No

Teachers

Josep Maria Folch Albareda
Marcelo Amills Eras
Joaquín Casellas Vidal

Prerequisites

Although there are no official prerequisites, it is convenient for the student to review the basic contents of Biology and Biochemistry.

Objectives and Contextualisation

It is a subject of the second year of the Veterinary degree, of a basic nature and in which the student must acquire the theoretical and practical knowledge that will allow him to understand the organization and structure of the genome in prokaryotes and eukaryotes, the mechanisms of gene expression and its regulation at the transcriptional and post-transcriptional levels, as well as knowing the different sources of genetic variation, from point nucleotide mutations to chromosomal rearrangements, and its impact on several phenotypes of veterinary interest. The student will also become familiar with various techniques of genome analysis and genetic variability. The specific training objectives are:

- Familiarize yourself with the basic concepts of Genetics.

- Know the mechanisms that regulate gene expression

- Understand how the transmission of phenotypic characters to offspring occurs.

- Understand the processes through which genetic and environmental factors affect phenotypic variation and the various pathologies of domestic species

- Know the techniques and methods of Molecular Genetics and Structural and Functional Genomics.

Competences

- 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 the physical, chemical and molecular bases of the main processes in the animal organism.

Learning Outcomes

1. Analyse the chromosomal basis of inheritance and the concept of ligation between genes.
2. Apply the molecular techniques used in the genome analysis (building of maps and genotyping of polymorphisms).
3. Communicate information obtained during professional exercise in a fluid manner, orally and in writing, with other colleagues, authorities and society in general.
4. Describe the processes that regulate the expression of genes in prokaryotes and eukaryotes.
5. Evaluate the effect of chromosomal mutations and rearrangement on the appearance of different pathologies in domestic species.
6. Interpret intra locus and between-gene interactions.
7. Interpret the patterns of inheritance of Mendelian and complex characters.

Content

The global content of this subject consists of five theoretical blocks:

Block 1. Organization and structure of the hereditary material.
Block 2. Gene expression.
Block 3. Inheritance and genetic variation.
Block 4. Analysis of the genome and its applications.
Block 5. Immunogenetics and herdopathology.

Likewise, the student will become familiar with the resolution of Genetics
Block A. Molecular Genetics Problems
Block B. Problems of Mendelian Genetics.
Block C. Linkage problems

Methodology

The teaching methodology that will be carried out during the whole learning process is fundamentally based on the student's work, and the teacher will be in charge of guiding him through this process. In accordance with the teaching objectives of the subject, the training activities that will be carried out are:

- Lectures: With these classes, the student acquires the basic scientific-technical knowledge of the subject that must be complemented with the study of the concepts explained.

- Self-learning-Problem solving: Students will be provided with a wide collection of solved problems where the way or ways of approaching and solving them is explained in a very detailed and didactic way. This tool will allow students to become familiar, in an autonomous but guided way, with this more practical aspect of the subject.

- Self-learning-Group work: This activity aims to promote group work, as well as enhance the ability to use computer resources to resolve issues of a biological nature. The student will be given a questionnaire with a series of questions related to the bioinformatic analysis of genetic data (data search, in silico analysis of sequences, navigation through genetic databases, etc.). Likewise, the student will be provided with information that will help him to become familiar with the bioinformatics tools he needs to solve the questionnaire. For example, if you are asked to build a restriction map of a DNA sequence, you will be instructed where to find the

online bioinformatics tool to do it and you will also be explained some general notions about its management. The work will be done in groups of 4 students

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Lectures	25	1	1, 2, 5, 4, 7, 6
Type: Autonomous			
Problem solving	17	0.68	1, 5, 7, 6
Study	24	0.96	1, 2, 5, 4, 7, 6
Work on Bioinformatic Resources	5	0.2	2, 3

Assessment

The evaluation will be individual and will be carried out continuously in the context of the different training activitie

Likewise, a work will be carried out, in groups of 4 students, consisting of
The marks obtained in the exams will constitute 80% of the global mark (
The students will have the opportunity to review the grades of the exams
Not evaluable: It will be considered that a student is not evaluable if he h

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exam 1: Theory (theoretical blocks 1 to 5)	50%	2	0.08	1, 5, 4, 7, 6
Exam 2: Problems (blocks A, B and C)	30%	2	0.08	1, 7
Work	20%	0	0	2, 3

Bibliography

Text Books

General Genetics:

BROWN T. A. (2002) Genomes. John Wiley and Sons. Tb en format online, accés lliure. http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=genomes.TOC&depth=2

GRIFFITHS A. J. F. & OTHERS (1999) Modern Genetic Analysis. Freeman and Co. Tb en format online, accés lliure. http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=mga.TOC

GRIFFITHS A. J. F. & OTHERS (2007) Genética. McGraw Hill-Interamericana.

LEWIN B. (2004) Genes VIII. Pearson Prentice Hall.

LEWIN B. (2006). Essential Genes. Pearson Prentice Hall.

NICHOLAS F. W. (1998). Introducción a la Genética Veterinaria. Acribia.

NICHOLAS F. W. (2003). Introduction to Veterinary Genetics. Blackwell Publishing.

PIERCE B. A. (2005). Genética, un enfoque conceptual. Panamericana.

Species-specific Genetics:

PIPER L. & RUVINSKY A. (1997). The Genetics of Sheep. CABI Publishing.

ROTHSCHILD M. F. & RUVINSKY A. (1998). The Genetics of the Pig. CABI Publishing.

FRIES R. & RUVINSKY A. (1999). The Geneticsof Cattle. CABI Publishing.

BOWLING A. T. & RUVINSKY A. (2000). The Genetics of the Horse. CABI Publishing.

RUVINSKY A. & SAMPSON A. J. (2001). The Genetics of the Dog. CABI Publishing.

Webs

Online Mendelian Inheritance in Animals - http://omia.angis.org.au/

Inherited Diseases Database in Dogs - http://www.vet.cam.ac.uk/idid/

Canine Inherited Disorders Database - http://www.upei.ca/~cidd/intro.htm

National Center of Biotechnology - http://www.ncbi.nlm.nih.gov

Ensembl - http://www.ensembl.org/index.html

Bovine Genome Database -http://genomes.arc.georgetown.edu/drupal/bovine/