

Course:	M547 - Veterinary Nursing in Small Animals Master
Degree:	Master
Curriculum Unit:	4001001 - Animal Biotechnology
Scientific field:	Veterinary Sciences
ECTS^(*):	6
Curriculum year:	1st
Curriculum semester:	1st
Frequency Regime:	Semestrial
Teacher(s):	Teresa Maria Montenegro de Araújo A. Correia Júlio César Oliveira Lopes
Contact hours ^(**):	TP-20; LP-10; TO-20
Total work time (hours):	150

(*) - ECTS - European Credit Transfer and Accumulation System

(**) – T- Theoretical; TP- Theoretical/Practical; LP- Lab Practice; S- Seminars; I- Internships; TU - Tutorials; TO – Tutorial Orientation; O- Other (Evaluations)

Objectives / Competences

Animal biotechnology is the use of science and engineering to modify living organisms and animal production systems or animal products processing. The goal is to make products, to improve for specific animal production uses. So, Animal Biotechnology provides new tools for improving human health and welfare and increasing livestock productivity. Animal Biotechnology improves the food we eat - meat, milk and eggs. Animal Biotechnology can also improve the animal's impact on the environment and enhances ability to detect, treat and prevent diseases. Animal biotechnology in use today is based on the science of genetic engineering. Under the genetic engineering exist other technologies, such as transgenics and gene therapy that also are used in animal biotechnology.

Syllabus

THEORETICAL

1. Integrated biotechnology study:
 - 1.1 Cellular structures and organization and functioning of tissues
 - 1.2 Structure of nucleic acids
 - 1.5 Control of gene expression, introns and promoters
- 2-Genomics, proteomics and metabolomics
 - 2.1 Identification and study of genes and mutations
 - 2.2 Recombinant DNA
 - 2.3 Cloning Strategies
 - 2.4 RNA interference
 - 2.5 Genome analysis

2.6 Genetic maps of companion animals

3- Molecular techniques with application to the veterinary clinic

3.1 Polymerase chain reaction (PCR) and its application in several types of diagnosis

3.2 Sequencing of DNA

3.3 Use of molecular markers

3.4 Gene therapy

3.5 Microarrays and typing of cancers

3.6 Transgenic animals

3.7 Chromosome anomaly and karyotype analysis

3.8 In situ hybridization

3.9 Applications of Biotechnology: Reproduction, Nutrition, Health and Food Safety

PRACTICE

- Development of experimental protocols
- Analysis and interpretation of data in bioinformatics software.
- Performing PCR and karyotypes.

Teaching methodologies and evaluation criteria

Theoretical lessons on fundamental concepts with complemented illustrative examples.

It is foreseen that each session is preceded by an oral presentation of the main topic, illustrated with practical examples and problems to increase group discussion and participation. Practical sessions, with conducting protocols depicting some of the techniques used in biotechnology.

TIC, "e-learning" and both auditory and visual stimuli are used to promote augmented learning, as well as teacher- student contact, even at a distance.

Theoretical component is performed by two written work

Or

Final written exam (working students)

Short bibliography

Barger, A.M.M, & Amy L. Clinical pathology and laboratory techniques for veterinary technicians. Ames, Iowa, etc. : Wiley-Blackwell, cop. 2015. XIV, 264 p.. ISBN 978-1-118-34509-2

Merck, M.D., Veterinary forensics : animal cruelty investigations. 1st ed. Ames, Iowa : Blackwell Publishing, cop. 2007. XXII, 327 p.. ISBN 978-0-8138-1501-5. ISBN 0-8138-1501-0

Kurnaz I.A. (2015). Techniques in Genetic Engineering. Taylor & Francis Group

Mitra S. (2015). Genetic Engineering principles and practice. McGraw Hill Education

Meneely P.M. (2014). Genetic analysis : genes, genomes, and networks in eukaryotes. Second edition. Oxford : Oxford University Press

Shashikant K., & Pfeifer J. (2015) Clinical Genomics: A guide to Clinical Next Generation Sequencing, 1st Edition. Amazon.com

Rapley R. , & Harbron S. (2011). Molecular Analysis and Genome Discovery. 2th edn. John Wiley & Sons, Chichester