Universitat Autònoma de Barcelona

2017/2018

Laboratory III

Code: 101945
ECTS Credits: 3

Degree	Type	Year	Semester
2500890 Genetics	OB	2	1

Contact

Name: Alba Hernández Bonilla
Email: Alba.Hernandez@uab.cat

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: Yes

Prerequisites

- It is mandatory to have taken -o being currently taking- the theoretical subjects related to the experimental work developed here.
- Biosecurity and security tests at 'campus virtual' need to be passed. The student must prove knowledge and acceptance of the Bioscience laboratory guidelines.
- It is necessary to go through the theoretical content of each module before the day of the practical classes.
- Wearing a lab coat is mandatory. It is not possible to enter to the lab without a lab coat.
- Attendance is mandatory.
- Students should come to the class following the assigned schedule. Changes in the original schedule need to be approved by the corresponding professor and in all cases before the starting of the classes.

Objectives and Contextualisation

The Integrated Laboratory III is the third course in a set of 6 which are distributed along 6 semesters of the first three courses of the degree of genetics. These subjects aim to give a solid foundation of experimental procedures, techniques and skills of genetics and related sciences. The practical work help to reinforce the theoretical concepts acquired in the theory, and allow us to understand the essential dialogue between theory and experimentation that have given rise to the body of knowledge that constitutes the science of genetics.

The Integrated Laboratory III has as objectives the acquisition of experimental skills in 4 specific modules of content:

- Molecular Biology of Eukaryotes
- Molecular Biology of Prokaryotes
- Cytogenetics
- Scientific Documentation

Objectives Molecular Biology of Eukaryotes:

- Use and manage the technical basic extraction, manipulation and amplification of nucleic acids.
- How to use techniques for the detection of different types of sequences within the genome.
- Apply the acquired knowledge to the design of an experiment in the field of genetics.
- Learn to identify the experimental techniques suitable for the development of a research project.

Objectives Molecular Biology of Prokaryotes:

The module of Molecular Biology of Prokaryotes gives the basics prokaryotes genetics. Their specific objectives are as follows:

- Know how to use the various techniques of incorporation of exogenous DNA in prokaryotes.
- Learn about systems that allow for the obtaining of new bacterial strains by mutagenesis processes in random or targeted mutagenesis.
- Know how to use tools that allow the study of gene expression in prokaryotes.

Objectives of Cytogenetics:

- Learning of the protocols for chromosomal preparations.
- Learning techniques for chromosome identification.
- Check the effects of ionizing radiation on the karyotype.

Objectives of Scientific Documentation:

The general objective is to provide a theoretical and practical base of knowledge that will enable the student to acquire basic information skills related to the search and information retrieval, as well as the resolution of information needs intrinsic to the scientific activity.

Specific objectives:

- Know the types of sources of bibliographic information.
- Learn how to solve information needs in the field of genetics and related using the most appropriate bibliographical resources.
- Know strategies to search and retrieve bibliographic information in electronic format.
- Gain criteria to question the reliability of the bibliographical sources.

Content

Module Molecular Biology of eukaryotes

Practice 1: extraction of genomic DNA and amplification by PCR of repetitive sequences and single copy

Practice 2: Agarose gel electrophoresis. Preparation of samples of DNA and a Dot Blot hybridization

Practice 3: Dot Blot detection, miniprep and enzymatic digestion

Practice 4: electrophoresis test and interpretation of the global results.

Module Molecular Biology of prokaryotes

• Session 1 (5 h) transfer of genetic material in prokaryotes.

• Session 2 (3 h). Processes of mutagenesis and recombination to obtain new strains.

• Session 3 (4 h). Use of mobile genetic elements to obtain mutants.

• Session 4 (3 h). Control of gene expression in prokaryotes.

Module cytogenetics

• First session

General introduction to practices

Preparation of chromosome spreads of human monocytes

• Second session

Uniform staining: microscopic analysis

Uniform staining: evaluation of the effects of ionizing radiation

• Third session

Human karyotype: features and nomenclature

G Bands: microscopic analysis

• Fourth session

Fluorescent in situ hybridization (FISH) on extensions of human chromosomes

Module Scientific Documentation

The module is divided into two sessions, two hours each, to be held in computerized classrooms. The contents of each session are:

Session 1. Search in bibliographic catalogues: the use of subject headings. Location of articles and bibliographic catalogues journal magazines. Search engine optimization of monographs. Locationof electronic publications (books and digital magazines). Use of the database contents.

Session 2. Structure of academic articles. Search in databases on Science and technology of the CSIC, academic repositories in open access, academic search engines and databases of theses.