

Cellular Culture

Code: 100929
ECTS Credits: 3

Degree	Type	Year	Semester
2500253 Biotechnology	OB	3	2

Contact

Name: Lleonard Barrios Sanromà
Email: Lleonard.Barrios@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: No

Other comments on languages

Cell culture

Teachers

Nerea Gaztelumendi Corcoles
Jorge Soriano Martin
Marta Martín Flix

Prerequisites

There are not

Objectives and Contextualisation

Cell Culture course is taught in the 2nd semester of the 3rd year of the Biotechnology degree in the Faculty of Biosciences. This is a subject with a certain degree of expertise that is intended to acquire a basic knowledge to work in a cell culture laboratory. It is therefore a subject with an important practical component.

Course objectives:

- 1) To know the basic equipment of a laboratory cultures.
- 2) To know the basic methodologies used in cell cultures.

Skills

- Apply general laboratory security and operational standards and specific regulations for the manipulation of different biological systems.
- Apply the principal techniques for the use of biological systems: recombinant DNA and cloning, cell cultures, manipulation of viruses, bacteria and animal and plant cells, immunological techniques,

microscopy techniques, recombinant proteins and methods of separation and characterisation of biomolecules.

- Describe the molecular, cellular and physiological bases of the organisation, functioning and integration of living organisms in the framework of their application to biotechnological processes.
- Design and implement a complete protocol for obtaining and purifying a biotechnological product.
- Interpret experimental results and identify consistent and inconsistent elements.
- Make decisions.
- Think in an integrated manner and approach problems from different perspectives.
- Work individually and in teams

Learning outcomes

1. Apply the different waste disposal processes correctly.
2. Apply the general safety rules in place in a biotechnology laboratory.
3. Describe the fundamental theory behind the basic and advanced techniques for obtaining and characterising biomolecules.
4. Interpret experimental results and identify consistent and inconsistent elements.
5. Make decisions.
6. Recognise the functioning of physiological processes in plants, with a view to using them in biotechnology.
7. Think in an integrated manner and approach problems from different perspectives.
8. Use basic techniques of immunodetection.
9. Use the appropriate methodology for studying the different types of biological samples.
10. Use the techniques for cultivating prokaryote and eukaryote cells and for manipulating biological systems.
11. Work individually and in teams

Content

Program lectures

0. Key events in the development of cell culture
1. Basic equipment and organization of a cell culture laboratory
2. Basic principles of cell cultures
3. Physicochemical conditions and cell culture media
4. Cryopreservation
5. Surfaces and scale up
6. Cell lines and production
7. Characterization
8. Contamination
9. Quantification, cytotoxicity tests and cell death
10. Synchronization
11. Immortalization
12. Organ cultures

Program of practical sessions

- Subculture of cell lines
- Cytogenetic and immunolabelling characterization
- Establishment of a cell growth curve
- Freezing and thawing in different conditions. Recovery rate.

Methodology

The Cell Culture course consists of theoretical lectures and practical classes in the laboratory.

The theoretical lectures will be conducted using audiovisual material prepared by the teacher. This material will be accessible to the students in the UAB Moodle before the session.

The practical classes are designed to teach students to use the laboratory instruments and to complement the theoretical. Students will do five practice sessions with a total of 16 h. Students will work in groups of two persons, and at the end of each practice should fill in a sheet with their results. These sheets will be in possession of teachers and used to assess the practical results, together with the final report compiled and submitted, by the students, 15 days after the end of the practical sessions.

Activities

Title	Hours	ECTS	Learning outcomes
Type: Directed			
Lectures	10	0.4	6, 3, 4, 7, 11
Practices	16	0.64	1, 6, 2, 4, 7, 5, 11, 9, 8, 10
Type: Supervised			
Tutorials	6	0.24	6, 4, 7, 5, 11
Type: Autonomous			
Study	38	1.52	3, 4, 7, 5, 11

Evaluation

The evaluation will consist of:

- Theoretical part.** Represent **70% of the final score**. Since the lectures will end in mid semester, approximately two-four weeks after its completion will be a written test. If there are students who fail this part, two-four weeks later it will be a recovery test.
- Practical laboratory part.** Represent **30% of the final score**. The score of this part will be obtained according with the results obtained. Attendance at laboratory classes is mandatory. Failure to attend one, two, three, or four sessions, will reduce the score of this part by 20%, 50%, 80% and 100% respectively.
- To pass the course requires a minimum global score of 5, with a minimum score of 4 in the theoretical part.**

NOT EVALUATED: Students who didn't perform any of the theoretical tests, or do not attend any practice will be considered as not evaluated.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Individual examination	70%	4	0.16	6, 4, 7, 5, 9
Laboratory practices	30%	1	0.04	1, 6, 2, 3, 4, 7, 5, 11, 9, 8, 10

Bibliography

Basic references

* R.I. Freshney. Culture of Animal Cells: A manual of basic technique and specialized applications. 6th Ed. Wiley-Liss, Inc. 2010.

* A. Doyle and J.B. Griffiths Eds. Cell and Tissue Culture: Laboratory procedures in biotechnology. John Wiley & Sons Ltd. 1999.

* J.P. Mather and D. Barnes Eds. Animal Cell Culture Methods. Methods in Cell Biology. Academic Press. 1998.