Universitat Autònoma de Barcelona

2018/2019

Cellular Culture

Code: 100929
ECTS Credits: 3

Degree	Type	Year	Semester
2500253 Biotechnology	OB	3	2

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

Other comments on languages

Cell culture

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 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. Cell lines and production
6. Characterization
7. Contamination
8. Quantification, cytotoxicity tests and cell death
9. Synchronization
10. Immortalization
11. Surfaces and scale up
12. Organ culture

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

Evaluation

The evaluation will consist in four activities:

1) **Test.** Represents **35% of the final score**.

2) **Written exam.** Represents **35% of the final score**.

3) **Results of laboratory Practices**. Represent **25% of the final score**. The score of this part will be obtained according with the results obtained. Attendance to practical sessions is mandatory. Not attending one of the sessions will penalize the score of this part by 25%. Students missing more than 20% of programmed sessions (two or more sessions) will be graded as "No Avaluable.

4) **Laboratory practices report**. Represents **5% of the final score**.

5) **To pass the course requires a minimum global score of 5, with a minimum of 3 in each of the parts**.

The students that did not pass, have the opportunity of a retake that will consist of two exams, one written and another test. The parts "Results of laboratory Practices" and "Laboratory practices report" are excluded from the retake process. To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as "No Avaluable" if the weighthin of all conducted evaluation activities is less than 67% of the final score.

Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Laboratory practice results	25%	0.5	0.02	1, 6, 2, 3, 4, 7, 5, 11, 9, 8, 10
Laboratory report	5%	1	0.04	4, 7, 5, 11
Test	35%	1.5	0.06	6, 4, 7, 5, 9
Written exam	35%	2	0.08	1, 2, 5, 9, 10

Bibliography

Basic references

* R.I. Freshney. Culture of Animal Cells: A manual of basic technique and specialized applications. 7th Ed. Wiley-Liss, Inc. 2016. Free acces to the 6th edition from UAB.

* 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.