

Cellular Culture

Code: 100887
ECTS Credits: 3

Degree	Type	Year	Semester
2500252 Biochemistry	OB	2	1

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

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 2nd year of the Biochemistry studies 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 used in biological systems: methods of separation and characterisation of biomolecules, cell cultures, DNA and recombinant protein techniques, immunological techniques, microscopy techniques, etc.
- Collaborate with other work colleagues.
- Design and prepare laboratory protocols, including health and safety aspects.
- Design experiments and understand the limitations of experimental approaches.
- Interpret experimental results and identify consistent and inconsistent elements.

- Process cells and tissues to obtain purified sub-cellular organelle preparations, and characterise them biochemically and structurally.
- Think in an integrated manner and approach problems from different perspectives.

Learning outcomes

1. Apply techniques for culturing eukaryotic cells.
2. Assess experimental data in relation to the values published in the scientific literature.
3. Collaborate with other work colleagues.
4. Design experiments and understand the limitations of experimental approaches.
5. Explain the fundamental theory behind basic and advanced techniques in biochemistry.
6. Explain the fundamental theory behind microscopy and centrifuging techniques, and the instrumentation used.
7. Interpret experimental results and identify consistent and inconsistent elements.
8. Monitor and interpret experiment protocols from a critical perspective.
9. Think in an integrated manner and approach problems from different perspectives.
10. Use the appropriate methodology for studying the different types of biological samples.
11. Use the established methods for eliminating the different types of waste products from a biochemistry and molecular biology laboratory.

Content

Lectures

0. Key events in the development of cell culture
1. Basic equipment and design of a cell culture laboratory
2. Basic principles of cell culture
3. Physicochemical conditions and culture media
4. Cryopreservation
5. Surfaces and scale up
6. Cell lines and production
7. Characterization
8. Contamination
9. Quantification, tests of cytotoxicity 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 theory 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 in the use of laboratory instruments and to complement the theory knowledge. Students will do five practice sessions of 16 h in total. Students will work in groups of two persons, and at the end of each practice should fill out a sheet with their results. These sheets will be in possession of teachers and will be used to evaluate the students work, together with the final report compiled by the students that should be submitted to the teacher 15 days after the completion of the sessions.

Activities

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

Evaluation

The evaluation will consist of:

- 1) **Theoretical part.** Represents **70% of the final score**. Since the lectures will end in mid semester, approximately two-four weeks later will be a written test. Students who fail will have, two-four weeks later, a recovery test.
 - 2) **Laboratory practical part.** Represents **30% of the final score**. The score of this part will be calculated according with the laboratory results. 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.
 - 3) 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	8, 4, 5, 6, 7, 9, 10
Laboratory practices	30%	1	0.04	1, 2, 3, 8, 5, 6, 7, 9, 11, 10

Bibliography

* 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.