27118 - Cell Culture

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	446 - Degree in Biotechnology
ECTS	6.0
Course	3
Period	First semester
Subject Type	Compulsory
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

5.1.General methodological presentation

This is an essentially practical course. Students are expected to acquire basic skills for the maintenance and use of cell cultures. Supervised laboratory classes will allow the student to develop the ability to plan experiments and analyze results, as well as to solve practical questions.

5.2.Learning activities

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The student will adquire Cell Culture skill through the following activities:

1) Lectures on the basis and uses of cell culture and fundamentals of the techniques used in laboratory sessions.

2) Laboratory sessions (11 sessions, 4 hours/session) according to the program described in 5.3.

3) Elaboration of a written report describing and discussing the results obtained in practical sessions.

4) Oral presentation and discussion of a technique and the results obtained in the laboratory sessions.

5.3.Program

1) Introduction to cell culture. Usefulness and applications of cell cultures. Limitations. Cell inspection with the (inverted) microscope. Cell viability and counting. Light microscope, phase-contrast microscope, fluorescence microscope. Freezing and thawing cells. Liquid nitrogen storage.

2) Culture of animal cells. Basic techniques of cell culture. Cell isolation and purification. Maintenance of cell cultures. Characterization and cryopreservation. Cell immortalization techniques and their problems. Security in biological laboratories.

3) Engineering cells. Introduction. Marker genes. DNA-transfection techniques. Primary cultures and cell lines. Transduction. Infection. Techniques to introduce exogenous proteins into cells.

4) Tissue biotechnology, Strategies. Stem cell culture *versus* specialized cell cultures. Purification and culture of stem cells. Cell differentiation techniques. Primary co-cultures.

5) Applications of cell cultures: Cells as protein factories: generation of monoclonal antibodies by hybridomas, recombinant proteins, vaccines, etc.

6) Contaminations: Detection and elimination.

7) Methods for the analysis of viability and cell proliferation.

5.4.Planning and scheduling

Introductory lectures will take place in the first week of the semester.

Laboratory classes will be held in Laboratory 1 (Dpt. Biochemistry, Molecular and Cell Biology, Building A, 2nd Floor).

Students will be assigned to a group at the beginning of the semester. Session dates for each group will be communicated in the Moodle platform. Dates for oral exposition and deadlines for laboratory reports will also be communicated in this platform.

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5.5.Bibliography and recomended resources

- **Manuals for laboratory sessions (including the schedule and procedures) and presentations used in lectures will be avalaible in the Moodle2 platform.**
- **Recommended bibliography and textbooks**

- Freshney, R.I. "Culture of animal cells: A manual of basic technique". 6th edition. John Wiley and Sons. Hoboken, NJ. 2010.- Freshney, R.I. "Animal cell culture. A practical approach". 3rd revised edition. Oxford University Press. Oxford. 2000.
- Catty, D. (ed.) "Antibodies. A practical approach". IRL Press. Oxford. 1990.
- Mosmann, T. Rapid colorimetric assay for cellular growth and survival: application to proliferation and cytotoxicity assays. J. Immunol. Meth. 65: 55-65. 1983.
- Lewin, B. "Genes IX". 9th Ed 2008.
- Ormerod, M.G. (ed.) "Flow cytometry. A practical approach". 3rd edition. IRL Press. Oxford. 2000.
- Rowland-Jones, S. and McMichael, A.J.. (ed.) "Lymphocytes. A practical approach". 2nd edition. IRL Press. Oxford. 2000.