

CELL CULTURE: PRACTICAL APPLICATIONS

CU characterization:

CU name: Cell culture: practical applications Scientific area acronym: BM Duration: Modular Working hours: 58 Contact hours: 30 ECTS: 3 Observations:

Optional curricular unit.

Contact hours distributed as follows, according to the timetable to be made available to students: 3 Theoretical; 6 Theoretical-Practical; 12 Practical; 3 Seminar; 6 Tutorials and 2 Evaluation. Maximum number of students: 9

Teacher in charge and respective teaching load in the CU:

Ana Armada - 24 hours

Sofia Cortes - 24 hours

Other teachers and respective teaching load in the CU: Fernando Cardoso - 24 hours Fátima Nogueira - 3 hours Invited teachers - 3 hours

Intended learning outcomes (knowledge, skills and competences to be developed by the students):

- 1. Acquisition of knowledge related to different types of cell lines and their applications;
- 2. Identification of good laboratory practices for safely handling cell cultures;
- 3. Application and manipulation of different animal cell culture techniques;
- 4. Evaluation of cell viability, using optical microscopy techniques and colorimetric tests;
- 5. Interpretation of the results obtained in the scope of the different tests performed;



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6. Recognition of the potential of different methodologies in the various areas of research.

Syllabus:

- I. Organizational structure and security of a cell culture laboratory;
- II. Cell types, their applications, cell media and substrates;
- III. Preparation of culture media and manipulation of cell cultures;
- **IV.** Cryopreservation of animal cells;
- V. Manipulation of cell lines;
- VI. Cell viability and cytotoxicity tests;
- VII. Basic concepts of immunofluorescence: labeling of nuclear DNA and intracellular proteins;
- VIII. Seminar addressing the application of cell cultures in various research areas.

Teaching methodologies:

This curricular unit (CU) aims to transmit theoretical knowledge and practical skills on manipulation of eukaryotic cell cultures and associated techniques, with application in different areas of research, such as the development of new drugs, which is transversal to the areas of Microbiology, Parasitology and Tropical Medicine. Theoretical classes will be based on the expository method; the theoretical-practical classes in expository and demonstrative methods; in practical classes, active and interrogative methods will be applied. The calendar also includes tutorial guidance sessions to support self-study.

Assessment:

The CU assessment is based on active participation in practical classes and exercise resolution (10% weighting) and an exam that includes theoretical and practical content (90% weighting). Attendance in at least 2/3 of the classes taught is mandatory and the final grade must be \geq 9.5 in 20. For improving the grade, or in case of non-approval to the CU, students will have to carry out an exam in a specific period. An anonymous student satisfaction questionnaire will be used to evaluate the CU and its teachers.

References for consultation / mandatory existence:

- Michael Aschner, Lucio Costa (2019) Cell Culture Techniques, Neuromethods 145, Springer New York; Humana;
- Cornelia Kasper, Verena Charwat, Antonina Lavrentieva (2018) Cell Culture Technology, Learning Materials in Biosciences, Springer International;
- Manual de Segurança Biológica em Laboratório (OMS), 2004.
 (<u>https://www.who.int/csr/resources/publications/biosafety/BisLabManual3rdwebport</u>.<u>pdf?ua=1</u>);
- Edmondson et al, 2014. Three-Dimensional Cell Culture Systems and Their Applications in Drug Discovery and Cell-Based Biosensors. In: ASSAY and Drug Development Technologies vol. 12 no.4, 207-218.