

## **66026 - Cellular separation. Cellular viability study**

### **Teaching Plan Information**

**Academic year:** 2024/25

**Subject:** 66026 - Cellular separation. Cellular viability study

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 537 - Master's in Molecular and Cellular Biology

**ECTS:** 6.0

**Year:** 1

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### **1. General information**

The objectives of this subject are that the student acquires knowledge about the existing techniques to approach the separation of cells according to specific characteristics, as well as the assessment of cell viability, and to become familiar with basic equipment for the analysis of cell samples such as fluorescence microscopy or flow cytometry.

### **2. Learning results**

1. Ability to work autonomously in a laboratory of Cell Biology or Separation and/or Analysis of cell samples.
2. Recognize and know how to apply the most appropriate separation techniques for different cell types.
3. Know how to apply cell counting methods with different types of samples.
4. Know how to identify and apply the most appropriate cell viability analysis techniques for different cell types, including the study of apoptosis.
5. Know how to determine the effect of certain treatments on cell viability and functionality.
6. Be able to search for and discuss information, as well as solve concrete problems.
7. Know how to communicate conclusions, and the ultimate knowledge and rationale behind them, to specialized and not specialized audiences with precision.

### **3. Syllabus**

#### **THEORY CLASSES**

Assessment of sperm functionality.

Isolation of motile cells.

Sperm sexing techniques.

Cell separation by centrifugation.

Electrophoresis of cells.

Cell separation by affinity techniques.

Cell sorting in aqueous biphasic systems.

#### **PRACTICAL CLASSES**

1. Sperm separation techniques: *Swim-up/Gradient centrifugation*. Efficiency comparison of both methods.
2. Influence of cold on sperm functionality: Assessment of viability, capacitation and reactive oxygen species levels.
3. Use of commercial polymers for cell separation.
4. Cell separation by partition chromatography in aqueous two-phase systems.

### **4. Academic activities**

Participative master classes: face-to-face and mandatory. Basic theoretical knowledge of the subject will be explained. 10 hours.

Practical classes: They will be carried out in the Biochemistry and Biology laboratory of the Veterinary School. They will be

carried out at the end of the theoretical classes, and what was learned during the classes will be put into practice. Face-to-face activities and mandatory. 40 hours.

Seminars: Students will make individual presentations of papers published in English in international scientific journals, related to the methodology learned in the theoretical classes. The presentation will be held during two sessions on different days (depending on the number of students) in front of the rest of the students and teachers. Face-to-face and mandatory. 10 hours.

## **5. Assessment system**

In order to pass this subject, the student must achieve an overall minimum grade of 5 points out of a total of 10, evaluated through the following activities:

1. Evaluation of a detailed report of the practical sessions describing the methods used with precision, making reference to what was explained in the theoretical classes. In addition, they must include the results obtained explaining the calculations performed, as well as a brief discussion of them. The grade will be the arithmetic mean of the grade of each practice and will represent 50% of the final grade.

2. Evaluation of the summary and presentation of a scientific paper: The presentation will have a maximum time limit of 10 minutes plus 5 minutes for discussion and questions. The following will be evaluated: clarity in the presentation, coherence in the order, interpretation and personal criticism, design of the presentation and answer to the questions (2 points maximum for each aspect). Also, they will deliver a critical analysis of the scientific work of a maximum of two pages in which the following will be valued: ability to highlight the fundamental aspects, adequate interpretation of the results and their critical analysis, contribution of original ideas in the discussion of the results and relationship with the content of theoretical classes (2 points maximum in each aspect). They will be graded from 0 to 10 and the presentation will contribute 40% and the abstract 10% to the final grade.

This evaluation is subject to attendance to theoretical and practical classes. In case of non-attendance, students will not be able to pass the subject.

## **6. Sustainable Development Goals**

3 - Good Health & Well-Being

4 - Quality Education

9 - Industry, Innovation and Infrastructure