COURSE DATA

DATA SUBJECT

Code: 43028
Name: The isolated organ, cell cultures and their applications
Cycle: Master's Degree / Doctorate
ECTS Credits: 3
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
2138 - Master's Degree in Research in and Rational Use of Medicines	Facultat de Farmàcia i Ciències de l'alimentació	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
2138 - Master's Degree in Research in and Rational Use of Medicines	The isolated organ, cell cultures and their applications	ELECTIVES

COORDINATION

MARTI CABRERA MIGUEL

SUMMARY

This course is offered within the \\\\"Master in research and rational drug use\\\\", which aims to deepen the field of medicine both in the aspect of biomedical research related to it, as a professional, in their wise use. Elective course for students who are interested in the research profile within the field above. It addresses the knowledge of the basics of conducting a research project based, from the methodological point of view, in functional studies of isolated organ or cell culture trials. It aims to integrate methodological aspects and physiological biochemical knowledge essential for understanding.

It is noteworthy that the skills and learning outcomes to be achieved in this subject, as well as the teaching methodology used, integrate the sustainable development goals (SDGs) promoted by the United Nations (2030 Agenda). Among them, it is important to highlight the Rational Use of Medication and the promotion of Community Health (Objective 3: Health and Well-being) and Quality Education (Objective 4).

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PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

Previous knowledge of Pharmacology, Physiology and English is required.

COMPETENCES / LEARNING OUTCOMES

2138 - Master's Degree in Research in and Rational Use of Medicines

Be able to apply the research experience acquired to professional practice both in private companies and in public organisations.

Be able to integrate new technologies in their professional and/or research work.

Be able to make quick and effective decisions in professional or research practice.

CG1 - Be able to access the information required (databases, scientific articles, etc.) and to interpret and use it sensibly.

Critically analyse one's own work and that of colleagues.

CT1 - Be able to access to information tools in other areas of knowledge and use them properly.

CT2 - To be able to assess the need to complete the scientific, historical, language, informatics, literature, ethics, social and human background in general, attending conferences, courses or doing complementary activities, self-assessing the contribution of these activities towards a comprehensive development.

Dominar el método científico, el planteamiento de protocolos experimentales y la interpretación de resultados en la búsqueda, desarrollo y evaluación de nuevos fármacos.

Dominar la comunicación científica. Poseer habilidades sociales y comunicativas en la práctica asistencial.

Know how to apply acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.

Know how to communicate your conclusions (and the underlying knowledge and reasons) to both specialist and non-specialist audiences in a clear and unambiguous way.

Know how to write and prepare presentations to present and defend them later.

Manejar adecuadamente las fuentes de información biomédica y poseer la habilidad de hacer una valoración crítica de las mismas integrando la información para aportar conocimientos a grupos asistenciales multidisciplinares

Possess the learning skills that will allow them to continue studying in a way that will be largely self-directed or autonomous.

Select and manage available resources (instrumental and human) to optimise research outcomes.

Students should possess and understand foundational knowledge that enables original thinking and research in the field.

To acquire basic skills to develop laboratory work in biomedical research.

Utilizar adecuadamente las herramientas informáticas, métodos estadísticos y de simulación de datos, aplicando los programas informáticos y la estadística a los problemas biomédicos

DESCRIPTION OF CONTENTS

1. Generalities

This unit will serve as a general introduction to the isolated organ and cell cultures as a methodology used in a biomedical research laboratory. These are structures isolated from the body at different levels and located in ideal conditions that allow their viability and the study of those functions that they present.

2. Physiological Solutions (SSF), Culture Media (CM) and Drug Solutions

For an isolated structure of the organism to be viable for a certain time, it is necessary to place it in a suitable environment that simulates, as much as possible, the conditions it had inside the organism. This is achieved with SSF, in the case of studies carried out in isolated organs, allowing the viability of the structure and its ability to develop its own physiological function, and with MC, in the case of cell cultures, in which case they additionally allow cell proliferation. Under these conditions, the only possibility of exposing the preparation (isolated organ or isolated cell) to a drug (or any other chemical substance) is to make a solution of it. In this last section we intend to carry out a review of the aspects to consider about the solutions of said substances.

3. Organ bath

Isolated organ studies are performed in a structure called an organ bath. In this thematic unit it is intended to carry out a review of the different aspects to take into account of the organ bath.

4. iological reagent

This unit aims to review the experimental animal or human being as the origin of the biological reagent (or preparation) to be used in studies on isolated organs and cell cultures. In both cases, a series of very exhaustive and different considerations must be taken into account, necessary to be able to carry out an adequate investigation from multiple points of view, including ethical and legal aspects.

5. Response types

This unit aims to review how to study different functions or responses in an isolated structure of the organism, both at the organ and cellular scale. Among others, we can highlight the secretory function, the motor function or the interaction between leukocyte and endothelial cells in the vascular territory.

6. Preparation stimulation procedures (biological reagent)

This unit aims to review the main stimulation procedures of a preparation, depending on the function to be studied, some experimental protocols used to evaluate certain mechanisms involved in a certain function, and specific preparations with their particular characteristics.

7. Results

This unit aims to review the collection of data obtained in a specific test as well as its subsequent treatment and the interpretation of the results.

8. Complementary methodologies

This unit aims to review some of the methodologies that can offer us complementary information to that obtained with functional studies.

9. Cell cultures

This unit aims to make a general review of cell culture as an experimental methodology. The different types of cell culture and their characteristics and the microscopic techniques for cell observation will be evaluated. Concepts such as primary culture, cell line, etc. will be introduced.

10. Protocols for obtaining and proliferating cells. Cell culture maintenance

This unit aims to review different protocols for obtaining, proliferating cells and maintaining a cell culture. The characteristics of particular cell cultures will be evaluated. Specific techniques in cell culture practice such as cell counting, cryopreservation, validation of cell lines, etc. will be analyzed.

11. Isolated cell applications

This unit intends to review some applications of isolated cells obtained from cell cultures, such as molecular biology techniques (western blotting, RT-PCR, etc.), intravital microscopy, fluorescence microscopy, confocal microscopy, cytometry of flow, oxygen consumption analysis, cell population separation techniques, etc.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Theory	19,00
Laboratory	6,00
Group work	5,00
Total hours	**30,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	0,00
Preparation of lessons	0,00
Preparation for assessment activities	0,00
Resolution of case studies	0,00
Total hours	**0,00**

TEACHING METHODOLOGY

Lectures. Participatory lecture
Seminars
Debate and discussion led
Classes participatory practices
Preparation and submission of papers
Consultation materials, background and work related to the subject matter of the course
To complete the classroom hours, the materials provided for face-to-face teaching will be adapted, so that the student can access them at any time. Use of the virtual classroom forum to answer questions.
For the practical sessions of the theoretical content, the use of videoconferences and / or the completion of the exercises proposed would be combined using the \\\"Task\\\" option in the virtual classroom.

ot;\"\"presentation\"\"\"">of the exercises proposed would be combined using the \\\"Task\\\" option in the virtual classroom.

EVALUATION

La información está en un formato que no se puede convertir

REFERENCES

- Armour C, et al. (1988). J Pharmacol Exp Ther, 245: 687-91 - Cortijo J et al. (1999). Free Radic Biol Med, 27: 392-400 - Nuñez C, et al. (2014). Nitric Oxide, 37: 17-27 - Herr DJ, et al. (2015). J Vis Exp, 101: 1-7 - De Pablo C, et al. (2012). Antiviral Therapy, 17: 1615-19 - Freshney, R.I. (2010).

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