VNIVERSITAT DE VALÈNCIA

Course Guide
43028 The isolated organ, cell cultures and their applications

COURSE DATA

Data Subject	
Code	43028
Name	The isolated organ, cell cultures and their applications
Cycle	Master's degree
ECTS Credits	3.0
Academic year	2024 - 2025

Study (s)

Degree	Center	Acad. year	Period
2138 - Master's Degree in Research in and Rational Use of Medicines	Faculty of Pharmacy and Food Sciences	1	First term

Subject-matter

Degree	Subject-matter	Character
2138 - Master's Degree in Research in and Rational Use of Medicines	6 - The isolated organ, cell cultures and their applications	Optional

Coordination

Name	Department
MARTI CABRERA, MIGUEL	135 - Pharmacology

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 (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

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

- 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
- Utilizar adecuadamente las herramientas informáticas, métodos estadísticos y de simulación de datos, aplicando los programas informáticos y la estadística a los problemas biomédicos
- 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.
- Possess the learning skills that will allow them to continue studying in a way that will be largely self-directed or autonomous.
- To acquire basic skills to develop laboratory work in biomedical research.
- 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.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Be able to integrate new technologies in their professional and/or research work.
- Know how to write and prepare presentations to present and defend them later.
- 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.

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- Be able to apply the research experience acquired to professional practice both in private companies and in public organisations.
- Dominar la comunicación científica. Poseer habilidades sociales y comunicativas en la práctica asistencial.
- Select and manage available resources (instrumental and human) to optimise research outcomes.
- Dominar el método científico, el planteamiento de protocolos experimentales y la interpretación de resultados en la búsqueda, desarrollo y evaluación de nuevos fármacos.

LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

At the end of the teaching-learning process the student should be able to:
1. Have acquired the basics of conducting a research project based, from the methodological point of view, in functional studies of isolated organ or essays on isolated cells. It aims to integrate methodological aspects and physiological biochemical knowledge essential for understanding.
2. Understanding the functional behavior of isolated structures in the body, at different levels (organ, tissue, cell, etc..).
3. Methodological knowledge acquisition and basic skills needed to work with this methodology in a laboratory.
4. Apply this knowledge to any particular structure of the organism.
5. Conduct a research project based, from the methodological point of view, in functional studies of isolated organ or essays on isolated cells.
6. Planning the right organization to perform work as a team and carry it out efficiently.
7. Using scientific databases, abstracts, full articles, etc.. needed to complete their training on the use of advanced techniques.

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.

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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.

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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

ACTIVITY	Hours	% To be attended
Theory classes	19,00	100
Laboratory practices	6,00	100
Group work	5,00	100
TOTAL	**30,00**	

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.

EVALUATION

The evaluation of the course will take into account the following sections with the appropriate rating:
Attendance, participation and continuous assessment: 30%
Works and presentation: 40%
Final exam: 30%
The minimum requirement to pass the course is to obtain a value equal to or greater than 50% in the overall assessment of learning, taking into account the percentages allocated to each section, the considerations to be made in paragraphs (1, 2, 3, 4 and 5).
(1) The initial assessment generally comprises an objective to assess students' knowledge in relation to

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the subject matter of the course, taking into account the likely differences in their basic training. Will be informative for teachers, in order to modulate the development of the course if necessary. In no case will be considered with respect to the overall evaluation of learning a particular student, at the end of the course.
(2) The course attendance is mandatory. Assistance is considered essential to 75% of the course. A number of faults, not justified, implies indicated above it is considered that the student does not exceed the minimum required to pass the course.
(3) The performance of work and its presentation is mandatory. The lack of this section is deemed that the student does not exceed the minimum required to pass the course. Work will be performed individually throughout the course, from those proposed at the beginning of it, and presented in the last days of the course.
(4) The final evaluation will consist of an objective test at the end of the course.

(5) Evidence of copying or plagiarism in any of the assessable tasks will result in failure to pass the subject and in appropriate disciplinary action being taken. Please note that, in accordance with article 13. d) of the Statute of the University Student (RD 1791/2010, of 30 December), it is the duty of students to refrain from using or participating in dishonest means in assessment tests, assignments or university official documents.

In the event of fraudulent practices, the "**Action Protocol for fraudulent practices at the University of Valencia**" will be applied (ACGUV 123/2020):

https://www.uv.es/sgeneral/Protocols/C83sp.pdf

REFERENCES

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