MODULE 4:

CARDIOVASCULAR AND KIDNEY DISEASES

Code: 43644 **Type:** Elective

Credits: 6 ECTS **Language:** English/Spanish

Module's Coordinator: Gerard Cantero, PhD ✉ gerard.cantero@vhir.org

Schedule for mentoring: Thursday, 3-5 pm

*Although having this timetable proposal, the **students have to arrange an appointment with the teacher by e-mail.***

OBJECTIVES

The aim of this module is to introduce the major cardiovascular and renal diseases and to provide the students with the knowledge of the current research and experimental approaches used for understanding the pathophysiological processes underlying these diseases. The module also addresses the identification of diagnostic and/or prognostic markers and potential therapeutic targets. Furthermore, the module will deepen in hot topics of the field, such as sex differences in cardiovascular and renal diseases and how to include them in our research, to generate critical and out-of-the-box thinking to the students. Finally, this module includes practical lessons to address some of the topics, like experimental models or the identification of biomarkers.

SKILLS

E01. Identify and use tools, techniques and methodologies of translational research to solve problems in human health.

E01.16. Learn morphological, imaging, biochemical, genetic, molecular and cellular techniques used in cardiovascular and kidney diseases research.

E01.17. Identify research methodologies to understand the pathophysiological mechanisms underlying cardiovascular and renal diseases.

E02. Use of experimental models of the diseases to improve pharmaceutical and biotech processes or to develop new products.

E02.4. Apply cell and molecular biology techniques to produce therapeutic and diagnostic products for cardiovascular and kidney diseases.

E03. Analyze the pathophysiology at the molecular level using the scientific method and identify its relationship with the clinical process of different diseases.

E03.4. Learn the processes that trigger cardiovascular and kidney diseases and their progression.

CONTENTS

1.2. Structure and functional characteristics of the mammalian kidney. Overview on most common kidney pathologies.
1.3. Acute kidney injury: Definition, symptoms, causes, risk factors and early diagnostic markers.
1.4. Perspectives on Chronic kidney disease: causes, progression and clinical management.

Lesson 2. Genetic causes of kidney diseases and paediatric renal pathologies.

2.1 Genetic and congenital abnormalities of the kidney (CAKUT). Renal function maturation.
2.2 Genetic causes of early-onset chronic kidney disease.
2.3 Collagen IV nephropathies.
2.4 Impact of basic research on primary tubulopathies.

Lesson 3. Impact on other systems. Current experimental models to study renal diseases.

3.1. Microbiota and renal diseases.
3.2. Arterial hypertension and the renal system.
3.3. Diabetic nephropathy. Lessons from experimental models.
3.4. The metabolic syndrome. Animal models and androgen action.

Lesson 4. Renal repair mechanisms and management of CKD end stage renal disease.

4.1. Dialysis.
4.2. Immunology of renal transplantation.
4.3. Regenerative medicine approaches for treatment of CKD. Mechanisms of renal cell repair and regeneration.

Lesson 5. Novel approaches for diagnosis of renal diseases.

5.1. Renal miRNA as potential biomarkers and therapeutic targets
5.2 Classic and novel biomarkers of renal dysfunction. Proteomic techniques.
5.3. New therapies against fibrosis: Targeted peptides
5.4 Pharmacological screenings to unveil novel therapies

Lesson 6. Practicum

6.1 Practical lessons I. Markers of renal function.
6.2. Practical lessons II. Markers of renal function.
6.3. Practical lessons II. Analysis of the data and abstract writing.

METHODOLOGY

Theoretical and practical lessons
Making reports/works
Autonomous study
Reading articles/reports of scientific interest
Presentation/ oral defense of works

Tutorials

EVALUATION

Theoretical partial exam	50%
Theoretical partial exam	30-50%
Submission of reports/works	10-20%

Note that:

- This module does not include a single evaluation system.
- Attending a minimum of 80% of the classes is required for taking the exam and passing the course. Unexcused absence of 20% or more mean failing the subject.

Second-chance examination:

- Students who fail the course (grade lower than 5), will be entitled to a second evaluation, provided that they have participated in all the evaluation activities and have a final average grade equal to or higher than 2.5.
- Second-chance evaluation will consist on the delivery of a written work related to the topics studied during the course and corresponding to the part failed.
- The maximum grade of the second-chance evaluation will be a pass mark (5).

TEACHING STAFF

Gerard Cantero Recasens*, PhD - *gerard.cantero@vhir.org
Principal Investigator at the Renal Physiopathology Group. VHIR.

Marisol Ruiz Meana*, PhD - *marisol.ruiz@vhir.org
Principal Investigator in Cardiovascular Diseases Research Group. VHIR.

ACADEMIC SCHEDULE

Timetable: From 30th September to 16th October 2024.

Exam dates: 4th November 2024 from 9 to 11 am.

See the Master's Degree Schedule for academic year 2024-2025

Classroom:
Please, check the information board at the Academic Office of the Teaching Pavilion in order to confirm the classroom before the class starts.