MODULE 4:

CARDIOVASCULAR AND KIDNEY DISEASES

Code: 43644 **Type:** Elective

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

Module's Coordinator: Gerard Cantero-Recasens, 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

This module aims to introduce the major cardiovascular and renal diseases from clinical and epidemiological point of view, as well as the molecular 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.

SKILLS

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

E01.8. Learn morphological, imaging, biochemical, genetic, molecular and cellular techniques used in cardiovascular and kidney diseases research.

E01.9. Identify research methodologies to understand the pathophysiological mechanisms underlying cardiovascular and renal diseases.

E02. Use of modification techniques in living organisms (or part of them) 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. Know the processes that trigger cardiovascular and kidney diseases and their progression.

CONTENTS

8.1. Cellular and molecular pathophysiology of arrhythmias
8.2. The Molecular Basis of Atrial Fibrillation
8.3. Ventricular arrhythmias and channelopathies. Scar
8.4. Learning of cardiovascular diseases. Final panel

SECTION II: KIDNEY DISEASES

Lesson 1. Introduction to the renal system and its function.

1.1. Structure and functional characteristics of the mammalian kidney. Overview on most common kidney pathologies.

Lesson 2. Acute kidney injury (AKI), chronic kidney disease (CKD) and renal repair mechanisms.

2.1 Acute kidney injury: Definition, symptoms, causes, risk factors and early diagnostic markers.
2.2 Perspectives on Chronic kidney disease: causes, progression and clinical management.
2.3 Regenerative medicine approaches for treatment of CKD. Mechanisms of renal cell repair and regeneration.
2.4 Microbiota and renal diseases

Lesson 3. Hypertension, diabetic nephropathy and CKD progression.

3.1. Arterial hypertension.
3.2. Diabetic nephropathy. Lessons from experimental models.
3.3. The metabolic syndrome. Animal models and androgen action.

Lesson 4. Kidney diseases in infants and children. Glomerulopathies and tubulopathies.

4.1. Genetic causes of early-onset chronic kidney disease.
4.2. Collagen IV nephropathies.
4.3. Genetic and congenital abnormalities of the kidney (CAKUT). Renal function maturation.
4.4. Impact of basic research on primary tubulopathies.

Lesson 5. Management of chronic kidney disease end stage renal disease. Biomarkers.

5.1. Dialysis.
5.2. Transplantation.
5.3. Transplant Immunology
5.4. Classic and novel biomarkers of renal dysfunction. Proteomic techniques.

METHODOLOGY

Theoretical classes
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%

Attending a minimum of 80% of the classes is required for taking the exam and passing the course.

TEACHING STAFF

Gerard Cantero Recasens, PhD - gerard.cantero@vhir.org
Junior Group Leader at the Renal Physiopathology Group. VHIR.

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

Antonia Sambola Ayala, MD PhD - asambola@vhebron.net
Specialist physician in Cardiology Department. HUVH.
Principal Investigator in Cardiovascular Diseases Research Group. VHIR.

ACADEMIC SCHEDULE

Timetable: From 28th September to 18th October 2021.

Exam dates: 2nd November 2021 from 8 to 10 am.

See the Master's Degree Schedule for academic year 2021-2022

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