



MODULE 1: TRANSVERSAL SKILLS FOR TRANSLATIONAL RESEARCH IN HUMAN PATHOLOGY

Code: 43643

Type: Compulsory

Credits: 9 ECTS

Language: Spanish/English

Module's Coordinator: Josep Quer Sivila, PhD

✉ josep.quer@vhir.org

Schedule for mentoring: Fridays, from 11:00 to 13:00h.

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

OBJECTIVES

This module aims to approach the students to the functioning of research in a tertiary hospital, by showing the different medical states from diagnostic to care of diseases.

The aim of the module is to enable students to acquire the basic knowledge on the ethical, methodological, regulatory and logistical aspects used in translational and clinical research, to be able to plan experiments in human pathology based on Genomics, Proteomics, Cytomics and Metabolomics, to acquire the knowledge to identify the transferability of the results of their research to the market, and to understand the bases and the application of new diagnostic tools (massive sequencing, magnetic resonance imaging, microarrays, nanotechnology, etc.) and advanced therapies in human pathology.

SKILLS

E01. Identify and use the concepts, tools, techniques and methodologies for translational biomedical research

E01.10. Identify the organizations that regulate biomedical research in hospital environment, as well as, their structure and management organs.

E01.11. Recognize the major syndromes identifying their main physiopathological features, as well as, the methods for diagnostic and research.

E01.12. Learn the techniques and methodologies used for diagnosis of disease in clinical, pathological, imaging and nuclear medicine laboratories.

E01.13. Learn surgical techniques and experimental surgery used in animal models.

E02. Use of modification techniques in living organisms (or part of them) to improve pharmaceutical and biotech processes or to develop new products.

E02.1. Distinguish the processes used in preclinical research of new therapeutic agents.

E02.2. Suggest the use of preclinical animal models and cell models in advanced therapies.

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

E03.1. Understanding the changes and processes that underlie the major syndromes and their diagnosis and treatment.

E03.2. Apply the basis of molecular mechanisms underlying human disease for diagnosis in problem cases.

E05. Conceive, design and develop scientific projects in translational research aimed to develop new therapies, diagnostics and prevention methods that can be implemented in clinical practice.

E05.1. Design a scientific project in translational/clinical research by applying knowledge acquired in the module and taking into account legal and methodological frameworks for this type of research.

CONTENTS

SECTION 1: INTRODUCTION TO CLINICAL PRACTICE IN THE HOSPITAL ENVIRONMENT.

- 1.1 Where are you? The Catalan Health System.
- 1.2 Transversal Facilities for Clinical Diagnosis
- 1.3 Pathology diagnosis services
- 1.4 Pharmacology and pharmacy
- 1.5 Molecular imaging in drug discovery and development

SECTION 2: TOOLS FOR DIAGNOSIS IN HUMAN PATHOLOGY I

- 2.1 NGS tools for translational biomedical research on emergent, re-emergent and new viral infections. The SARS-CoV-2 pandemics.
- 2.2 NGS tools to study viral persistence.
- 2.3 Human microbiome in clinical pathologies
- 2.4 Exosomes and disease follow up.
- 2.5 Microarrays, GWAS, Manhattan plots, tools in dementia and other neurodegenerative disorders.
- 2.6 Liquid biopsy for prenatal diagnosis
- 2.7 Cell lines in translational research
- 2.8 Mitochondrial genetics: methods for the study of mitochondrial diseases and translational research to develop new therapies
- 2.9 Animal models
- 2.10 Organoids to reduce animal model experimentation
- 2.11 Proteomics in diagnosis.
- 2.12 Proteomics, tool for biomedical research. Development of a cancer kit.
- 2.13 Advanced Therapies. Gene Therapy. Stem Cells. Fetal Repair.
- 2.14 Cell therapy for fetal repair
- 2.15 Immunotherapy
- 2.16 General Introduction to Nanomedicine. Drug delivery systems

SECTION 3: CLINICAL RESEARCH AND CLINICAL TRIALS

- 3.1 Methods for Clinical Research
- 3.2 Methods for Clinical Research. Methodologies. Observational epidemiologic studies: Design, advantages and disadvantages. Principal bias.
- 3.3 Clinical trials. Ethical and Legal issues of clinical research
- 3.4 From a clinical problem to a clinical trial.

METHODOLOGY

Theoretical classes
 Guided visits
 Making reports/works
 Autonomous study
 Reading articles/reports of scientific interest
 Presentation/ oral defence of works
 Tutorials

EVALUATION

Writing a research project based on a clinical problem (team work)	30%
Oral defence of the research project (team work)	30%
Multiple choice test exam	30%
Attendance and participation in class	10%

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

TEACHING STAFF

Ibane Abasolo Olaortua, PhD - ibane.abasolo@vhir.org
 Principal Investigator in Drug Delivery and Targeting Research Group. CIBBIM-Nanomedicine. VHIR.

Jordi Barquinero Mañez, PhD - jordi.barquinero@vhir.org
 Head of Cell and Gene Therapy Research Group. VHIR.

Ignacio Ferreira González, MD PhD - iferreir@vhebron.net
 Specialist physician in Cardiology Departament. HUVH.
 Principal Investigator in Cardiovascular Diseases Research Group. VHIR.

Josep Quer Sivila, PhD - josep.quer@vhir.org
 Principal Investigador in Liver Diseases Research Group. VHIR.

Francisco Rodríguez Frías, PhD - frarodri@vhebron.net
 Principal Investigador in Liver Diseases Research Group. VHIR.

ACADEMIC SCHEDULE

Dates: from 28th September to 4th November 2021.

Exam dates: 17-18-19th November 2021.

[See the Master's Degree Schedule for academic year 2021-2022](#)