

Degree	Type	Year
Bioquímica, Biología Molecular y Biomedicina	OP	1

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

- Requirements to be admitted to the master's degree.
- English Level B2.

Objectives and Contextualisation

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.

Learning Outcomes

1. CA22 (Competence) Resolve real problems in Clinical Translational Research, providing original ideas that represent an advancement in the field.
2. CA23 (Competence) Adequately convey to a general public applied conclusions in the field of Translational and Clinical Research.
3. KA31 (Knowledge) Identify the main trends in the field of Clinical Translational Research.
4. KA32 (Knowledge) Identify new methodological and interpretative advances in Laboratory Medicine.
5. KA33 (Knowledge) Identify bioinformatics and other tools used to process genomic data that facilitates research or laboratory diagnosis of human diseases.
6. SA30 (Skill) Use the scientific method to analyse clinical results referring to different groups of pathologies at the molecular level.
7. SA31 (Skill) Apply new methodological and interpretative advances that facilitate the research or laboratory diagnosis of human diseases.
8. SA32 (Skill) Analyse morphology and normal physiological processes and their pathological alterations at the molecular level.

Content

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

0. Introduction and Welcome.

1.0 Transversal Facilities for Clinical Diagnosis/Biobank

1.1 Where are you? The Catalan Health System.

1.2 Clinical and diagnostic data management in the Catalan Health Care System

1.3 Pharmacology and pharmacy. Vaccine and drug's safety and efficacy evaluations.

1.4 Pathology diagnosis services.

1.5 Imaging in Drug Discovery and Development: An overview.

SECTION 2: TOOLS FOR DIAGNOSIS IN HUMAN PATHOLOGY I

2.1 Next Generation Sequencing (NGS) in virology and precision medicine.

2.2 Application of NGS to translational biomedical research (TBR).

2.3 Metagenomics in TBR.

2.4 Bioinformatics in TBR.

2.5 Human microbiome in clinical pathologies.

2.6 Cytogenetic tools for prenatal and postnatal diagnosis

2.7 Genomics and Biomarkers in dementia and other neurodegenerative disorders.

2.8 Proteomics, tool for biomedical research. Development of a cancer kit.

2.9 Exosomes: biology and clinical potential.

2.10 Mitochondrial genetics: methods for the study of mitochondrial diseases and translational research to develop new therapies.

2.11 Single-cell multiomics in immunology

- 2.12 Cell lines in translational research.
- 2.13 Organoids to reduce animal model experimentation & Intravital microscopy.
- 2.14 Cell therapy for fetal repair.
- 2.15 Immunotherapy.
- 2.16 CAR-T cell therapy.
- 2.17 Drug delivery systems.
- 2.18 Animal models.
- 2.19 Advanced Therapies. Gene Therapy. Stem Cells.
- 2.20 Nanotech in Medicine. Cerium Oxide as a therapeutic tool.

SECTION 3: CLINICAL RESEARCH AND CLINICAL TRIALS

- 3.1 Methods for Clinical Research Methodologies. Observational epidemiologic studies: Design, advantages and disadvantages. Principal bias.
- 3.2 Clinical trials. Ethical and Legal issues of clinical research

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Theory classes	65	2.6	
Type: Supervised			
Mentoring	3	0.12	
Type: Autonomous			
Study	154	6.16	

Theoretical classes. Discussion of problems in class. Visit laboratories. Stimulate the interest of the students to solve real or putative clinical problems. Reading articles to propose a team based research project. Discussion of projects.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous Assessment Activities



Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance and participation in class	10%	0	0	
Delivery of research project	30%	0	0	CA22, KA31, KA32, KA33, SA30, SA31, SA32
Oral presentation of the project	30%	1	0.04	CA23
Test exam	30%	2	0.08	KA31, KA32, KA33, SA31

Evaluation

This course/module does not include a single assessment system.

Writing a project based on a clinical problem (team work) 30%

Defence of the project in front of all the students and evaluators 35%

Test exam 35%

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

To be eligible for the retake process, the student should have been previously evaluated in a set of activities equaling at least two thirds of the final score of the course or module. Thus, the student will be graded as "No Avaluable" if the weightin of all conducted evaluation activities is less than 67% of the final score

Bibliography

At the Bench: A Laboratory Navigator. Updated Edition. Kathy Barker. Cold Sprinh Harbor Laboratory Press, Cold Spring Harbor, New York, 2005.

GeneReviews (<http://www.ncbi.nlm.nih.gov/books/NBK1116/>)

Edited by Roberta A Pagon, Editor-in-chief, Thomas D Bird, Cynthia R Dolan, and Karen Stephens. Seattle (WA): University of Washington, Seattle; 1993-.

Molecular Diagnostics: Techniques and Applications for the Clinical Laboratory. 2009. Edited by: George P. Patrinos and Wilhelm J. Ansorge. 2nd ed. p. 616. Academic Press. 1st ed. p. 736. Academic Press.

Molecular Pathology: The Molecular Basis of Human Disease. 2009. 1st ed. p. 664. Academic Press.

Transforming Clinical Research in the United States: Challenges and Opportunities, Workshop Summary, Forum on Drug Discovery, Development, and Translation Board on Health Sciences Policy, Institute of Medicine of the National Academies, The National Academies Press, Washington D.C.
<http://fastercures.org/train/resources/documents/TransformingClinicalResearchintheUnitedStates.pdf>

Biotechnología Aplicada a la Identificación y Validación de Dianas Terapéuticas. Informe de Vigilancia Tecnológica, Genoma España, http://www.gen-es.org/12_publicaciones/docs/pub_73_d.pdf

Impacto de la Biotechnología en el sector Sanitario (SECURED), 1er Informe de Prospectiva Tecnológica, Genoma España http://www.gen-es.org/12_publicaciones/docs/pub_63_d.pdf

The Human Protein Atlas (www.proteinatlas.org)

Software

No Procedeix

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(TEm) Theory (master)	1	English	annual	morning-mixed