



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Biomedicina, Neuroscienze e Diagnostica avanzata		
<b>ACADEMIC YEAR</b>	2023/2024		
<b>MASTER'S DEGREE (MSC)</b>	MEDICAL BIOTECHNOLOGIES AND MOLECULAR MEDICINE		
<b>INTEGRATED COURSE</b>	BIOTECHNOLOGICAL APPLICATIONS IN MEDICINE - INTEGRATED COURSE		
<b>CODE</b>	13120		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	2		
<b>SCIENTIFIC SECTOR(S)</b>	MED/09, MED/40		
<b>HEAD PROFESSOR(S)</b>	CEFALU' ANGELO BALDASSARE	Professore Ordinario	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	SCHILLACI ROSARIA	Ricercatore	Univ. di PALERMO
	CEFALU' ANGELO BALDASSARE	Professore Ordinario	Univ. di PALERMO
<b>CREDITS</b>	9		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<b>CEFALU' ANGELO BALDASSARE</b> Thursday 12:00 13:30 Dipartimento Biomedico di Medicina Interna e Specialistica, Plesso ex clinica medica II, via del vespro 141, piano rialzato		
	<b>SCHILLACI ROSARIA</b> Tuesday 11:30 12:30 Divisione di Ostetricia e Ginecologia, Ospedale Cervello		

<b>PREREQUISITES</b>	Basic knowledge of molecular biology and genetics. Basic knowledge about the biological basis of inheritance. Basic knowledge of biochemistry. Knowledge of the basic principles of cell and developmental biology. Knowledge of the physiology of human reproduction. Expertise in setting and maintaining in vitro cell and tissue cultures. Basic knowledge of anatomy and physiology of the endocrine glands and biochemistry of the main metabolic pathways. Strong background in molecular and cell biology.
<b>LEARNING OUTCOMES</b>	<ul style="list-style-type: none"><li>- Knowledge and understanding: After completing the course, students will be able to: - know the pathophysiological bases of human diseases with particular attention to degenerative, metabolic and organ failures, in the area of internal medicine, with particular attention to etiological and pathogenetic mechanisms on cellular and molecular basis; - know, congenital or acquired disorders, of internal medicine context, in which it is possible to apply a biotechnological approach; - acquire the ability to select and interpret information, design and apply diagnostic and therapeutic strategies based on biotechnology, in collaboration with the Medical doctor in the areas of internal medicine; - acquire skills in planning the development of scientific and technical-productive biotechnological processes; - Know about the main causes of infertility in males, females and couples and therapeutic approaches for their treatment by Assisted Reproductive Techniques (ART); - Analyze and apply the available methods to study the molecular mechanisms of endocrine and metabolic diseases and sterility; - Understand the advantages and the limitations of Assisted Reproductive Techniques (ART); - Know the basic principles for the development of innovative drugs;</li><li>- Applying knowledge and understanding: The knowledge acquired during the course may be directly spent in the work setting (research laboratories or in hospital based and private diagnostic laboratories, PMA laboratories). They will also be able to integrate the acquired knowledge with a critical approach oriented to solving complex requests, by choosing the most appropriate clinical, laboratory methodologies and advanced treatment work up.</li><li>- Making judgments: Students will be able to evaluate in a logical and autonomous manner the knowledge provided by the course and will be able to face different issues related to applied biotechnology through a scientific approach. Students will be able to interpret the results of clinical and laboratory investigations and independently seek for the scientific information able to support their conclusions.</li><li>- Communication: Acquisition of communicative skills acquired through the oral examination and the public presentation of data, experimental results and laboratory experiences acquired during the internship. Students will apply and clearly convey the acquired knowledge in verbal form by using multimedia supports.</li><li>- Learning skills: Ability of continuous learning through the consultation of information resources (scientific publications, databank and in silico computing resources) linked to biotechnology applied to research and advanced diagnostics in the field of medicine.</li></ul>
<b>ASSESSMENT METHODS</b>	Evaluation of the knowledge through an oral examination. The oral exam consists in general of 20-30 minute interview aimed at evaluating the knowledge of the program of the courses. The evaluation is expressed in a grading scale up to thirty. The evaluation scheme is as follow: a) 30 and 30 cum laude, excellent knowledge of the contents of the courses; The student demonstrates high analytical-synthetic capabilities and is able to apply the acquired knowledge for solving problems of high complexity; b) 27-29, excellent knowledge of the teaching content and excellent language skills; The student demonstrates analytical-synthetic skills and can apply knowledge to solve complex problems; c) 24-26, good knowledge of teaching content and good language skills; The student is able to solve problems of medium complexity; d) 21-23, Discreet knowledge of the content of teaching, in some cases limited to the main topics; Acceptable ability to use the specific language of the disciplines and to apply the acquired knowledge independently; E) 18-20, Minimum knowledge of the content of teaching, often limited to the main topics; Modest ability to use the specific language of the discipline and low grade of autonomy; F) Does not have an acceptable knowledge of the main contents of the teaching; Very little or no ability to use the specific language of the discipline and to apply the acquired skills independently. The final mark is the arithmetic mean of the marks of the two teaching modules.
<b>TEACHING METHODS</b>	Frontal lessons; laboratory exercises for all teaching modules

# MODULE PHYSIOPATHOLOGICAL BASES OF HUMAN PATHOLOGIES AND CLINICAL APPLICATIONS OF BIOTECHNOLOGIES

*Prof. ANGELO BALDASSARE CEFALU'*

## SUGGESTED BIBLIOGRAPHY

Materiale fornito dal docente: Principali articoli di revisione della letteratura e lavori originali sperimentali relativi agli obbiettivi formativi del corso

<b>AMBIT</b>	50636-Discipline di base applicate alle biotecnologie
<b>INDIVIDUAL STUDY (Hrs)</b>	102
<b>COURSE ACTIVITY (Hrs)</b>	48

## EDUCATIONAL OBJECTIVES OF THE MODULE

The course has the objective to provide the basic knowledge on the pathophysiological bases of human diseases with particular attention to degenerative, metabolic and organ failures, in the area of internal medicine, with particular attention to etiological and pathogenetic mechanisms on cellular and molecular basis. The learning objective of the course is also to provide the tools for the correct approach to the study and characterization of animal models of human metabolic diseases and it will highlight the basic principles of Molecular Biology and Biochemistry Methodologies in order to clarify the pathogenesis and pathophysiology of human genetic diseases in animal models and target identification and clinical development of innovative drugs

## SYLLABUS

Hrs	Frontal teaching
2	Laboratory strategies for the biochemical diagnosis of human diseases
2	Laboratory strategies for the molecular diagnosis of human diseases
2	Physiopathological and molecular basis of atherosclerosis
2	Physiopathological and molecular basis of diabetes
2	Physiopathological and molecular basis of adipose tissue
2	Physiopathological and molecular basis of chronic liver diseases
2	Target identification and principle of clinical development of innovative drugs
2	Pre clinical development of innovative drugs
2	Physiopathological and molecular basis and development of innovative drugs in rare disorders of metabolism
2	Physiopathological and molecular basis and development of innovative drugs in rare disorders of metabolism
2	Development and application of innovative therapies in diabetes
2	Animal models for the study of physiopathological and molecular basis of hereditary diseases
2	Animal models for the study of physiopathological and molecular basis of hereditary diseases
2	Physiopathological and molecular basis and development of innovative drugs in rare disorders of metabolism
2	Physiopathological and molecular basis and development of innovative drugs in rare disorders of metabolism
2	Physiopathological and molecular basis of complex diseases
Hrs	Practice
8	Laboratory strategies for in vitro preclinical evaluation of small molecules and nucleic acids
8	Candidate gene responsible of rare metabolic diseases analysis

**MODULE**  
**HUMAN REPRODUCTION BIOTECHNOLOGIES**

*Prof.ssa ROSARIA SCHILLACI*

**SUGGESTED BIBLIOGRAPHY**

Lucia Rocco: Biologia e tecniche della riproduzione. ISBN: 9788870517477

David K. Gardner: Textbook of Assisted Reproductive Techniques. Fifth Edition. ISBN: 9781498740098

<b>AMBIT</b>	20885-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	51
<b>COURSE ACTIVITY (Hrs)</b>	24

**EDUCATIONAL OBJECTIVES OF THE MODULE**

The educational objectives are: learning of the physiological mechanisms of human reproduction and their alterations; knowledge and evaluation of therapeutic approaches for treatment of different types of infertility; understanding the differences between PMA techniques; knowledge of the advantages and disadvantages of each technique; knowledge of culture and storage methods of human gametes, embryos and ovarian tissue.

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
2	Elements of human reproduction physiology
2	Infertility: definition, causes and treatment
2	Assisted Reproduction Techniques: intrauterine insemination (IUI)
2	Assisted Reproduction Techniques: in vitro fertilization and intrauterine human embryo transfer (IVF and ET)
2	Assisted Reproduction Techniques: intracytoplasmic sperm injection (ICSI)
2	Preimplantation genetic diagnosis. In vitro oocyte maturation. Assisted reproduction techniques in HIV positive couples.
2	Cryopreservation of human gametes, embryos and ovarian tissue. Techniques of fertility preservation
2	Rules on PMA
<b>Hrs</b>	<b>Workshops</b>
8	Evaluation of seminal parameters and in vitro semen treatment.