



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2023/2024		
MASTER'S DEGREE (MSC)	NEUROSCIENCE		
INTEGRATED COURSE	CELL BIOLOGY AND ANATOMY - INTEGRATED COURSE		
CODE	21032		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/16, BIO/13		
HEAD PROFESSOR(S)	CORRADO CHIARA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	BURGIO STEFANO	Professore a contratto	Univ. di PALERMO
	CORRADO CHIARA	Professore Associato	Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	CORRADO CHIARA Wednesday 15:00 - 17:00 Dip. DiBiMed, Sez. di Biologia e Genetica -via Divisi 83, 90133 Palermo chiara.corrado@unipa.it		

DOCENTE: Prof.ssa CHIARA CORRADO

PREREQUISITES	Knowledge of the fundamentals of Biology according to the requirements for admission to the Master's Degree in Neurosciences. The student must have basic knowledge relating to the main processes that regulate cell activity. For example DNA Duplication, Transcription, and Protein Synthesis. The cell cycle. Mitosis and Meiosis.
LEARNING OUTCOMES	<p>Knowledge and understanding. The student will acquire the knowledge and understanding of the following aspects of cell biology: the molecular basis that they govern the main functions of neuronal and glial cells of vertebrates and in particular of man, cell-cell and cell communication strategies nervous-microenvironment, the molecular basis of neurogenesis and neuronal differentiation, the properties of stem cells and the possible ones applications in regenerative medicine. Furthermore the student will acquire knowledge on the cellular and genetic basis of some pathologies neurodegenerative. As regards the study of Human Anatomy Lo student will achieve minimal knowledge of the human body, position and structure of the individual organs. He will acquire the knowledge of the relationships between the different systems and alterations in anatomical and functional integrity capable of cause disease.</p> <p>Ability to distinguish, organize and apply independently. Thanks to the knowledge acquired in these subjects the student in Neurosciences will be able to apply this knowledge to scientific experimentation, on nerve and stem cells. The basic knowledge acquired is fundamental for the study of human physiology and for the understanding of etiological events capable of altering the body's homeostasis and generating disease. In fact, the student will be able to connect the basic functions together of the cell to ensure the physiology of the tissues. Acquired knowledge of the main methodologies of cell biology, and the ability to recognize an organ by its microscopic structure will allow it to understand and design biomedical applications. Thanks to educational activities carried out in the laboratory, the student will be able to work in a sterile environment with cell cultures, to prepare cell and tissue preparations for observation a brightfield or fluorescence microscopy, to apply methods for the morphological analysis and procedures for the acquisition of images of cellular preparations and fresh tissues of the nervous system.</p> <p>Autonomy of judgment: The student will be able to evaluate and integrate, in autonomously the knowledge acquired in biology and genetics in the study of the nerve cell; moreover, it will be able to evaluate the implications that the alterations of biological processes have on the main pathologies human neurodegenerative.</p> <p>The student will acquire analysis and synthesis skills for the formation of a critical thinking on the issues studied for subsequent application in the context of biotechnological methodologies.</p> <p>Communication skills. The student will acquire the ability to communicate and illustrate, in a simple way, even to a non-expert public, the processes of biology in the study of neuronal differentiation. It will acquire the capacity to describe the human body using appropriate terminology and it will be in able to interact with other professionals involved in the courses diagnostic-therapeutic through efficient team work.</p> <p>Learning ability. The student will acquire the ability to use correctly the specific scientific bibliography of the sector for a continuation updating of knowledge in the biomedical field and more specifically of neuroscience. You will be able to learn and follow suitably, using the knowledge acquired in the course, the subsequent teaching courses of the course of study. You will be able to integrate the knowledge of cytology, histology, anatomy, physiology and human pathology in order to fully understand the complex functioning of the human body and the complex interactions between the different anatomical districts. The student will be able to understand the application and also the limitations of biotechnology applied to the field of biomedical.</p>
ASSESSMENT METHODS	In order to verify the knowledge acquired in Cell Biology and Human Anatomy, necessary for the student to be able to face the study of the others subjects such as Neuroanatomy, Neurophysiology, Neuropathology e Neuropharmacology, the student's evaluation includes an oral exam. Such oral exam is aimed at ascertaining the acquisition of skills and competences knowledge required by teaching. The evaluation is expressed in thirtieths. The candidate will be asked a minimum of two questions per module aimed at verifying the knowledge acquired on the fundamental notions of both modules. All questions are aimed at understanding the skills processing and the possession of an adequate exhibition capacity. However, just in case serious deficiencies on fundamental topics, the exam can be interrupted even after just one question. The evaluation is expressed out of thirty according to the following scheme

	<p>30-30 and praise. Excellent knowledge of the contents of the teachings; the student demonstrates high analytical-synthetic ability and is able to apply the knowledge to solve highly complex problems.</p> <p>27-29. Excellent knowledge of the contents of the teachings and excellent properties of language; the student demonstrates analytical-synthetic ability and is able to apply knowledge to solve problems of average complexity and, in some cases, even high.</p> <p>24-26 Good knowledge of the contents of the teachings and good ownership of language; the student is able to apply knowledge to solve problems of medium complexity.</p> <p>21-23 Fair knowledge of the contents of the teachings, in some cases limited to main topics; acceptable ability to use language specific to the disciplines and to independently apply the acquired knowledge.</p> <p>18-20 Minimum knowledge of the contents of the teachings, often limited to main topics; modest ability to use the specific language of disciplines and to independently apply the acquired knowledge.</p> <p>Insufficient. He does not have an acceptable knowledge of the main contents of the teachings. very little or no ability to use language specific to the discipline and to independently apply the acquired knowledge.</p>
TEACHING METHODS	Lectures and laboratory activities.

<p>MODULE HUMAN ANATOMY</p> <p><i>Prof. STEFANO BURGIO</i></p>	
SUGGESTED BIBLIOGRAPHY	
Seeley's Anatomy & Physiology Publisher : McGraw-Hill Education; 12th edition (April 12, 2019) Language : English ISBN-10 : 1260565963; ISBN-13 : 978-1260565966. Also the 11th and 10th editions may be used.	
AMBIT	50505-Discipline del settore biomedico
INDIVIDUAL STUDY (Hrs)	98
COURSE ACTIVITY (Hrs)	52
EDUCATIONAL OBJECTIVES OF THE MODULE	
Learn the basic knowledge of the human body to recognise an organ and determine its function and location. Learn the structure and function of each apparatus to understand neuroanatomy and neurophysiology. Moreover, the human anatomy basis are important to study all the other MED teachings. Practise in Human Anatomy will focus on the techniques of histochemistry, immunohistochemistry, electron microscopy applied to the study of Human Anatomy and their modern applications in the biomedical field to prepare the student to tackle an experimental thesis in the field of neuroscience.	

SYLLABUS

Hrs	Frontal teaching
4	Microscopic and macroscopic anatomy. Levels of organization. Basic functions of a living being. Organ systems of the human body. Position and movement terminology. Overview of all the apparatuses of the human body.
10	The Skeletal System
2	The muscular system
4	The Cardiovascular system
2	The lymphatic system
6	The digestive system
2	The respiratory system
4	The Urinary and endocrine systems
2	The integumentary systems
4	The reproductive system
Hrs	Workshops
6	Organ dissections, preparation of tissue samples for histology, immunofluorescence and confocal. Basics of bright field, fluorescence, straight, inverted microscopes.
6	Operation of the Electron microscope and its potential applications.

**MODULE
CELL BIOLOGY**

Prof.ssa CHIARA CORRADO

SUGGESTED BIBLIOGRAPHY

Basic Neurochemistry: Principles of Molecular, Cellular, and Medical Neurobiology. Scott Brady George Siegel R. Wayne Albers Donald Price Eighth Edition •2012 ISBN 978-0-12-374947-5
Fundamental Neuroscience. Larry Squire Darwin Berg Floyd E. Bloom Sascha du Lac Anirvan Ghosh Nicholas C. Spitzer. fourth edition ISBN 978-0-12-385870-2
Reviews on specific topics made available by the professor.

AMBIT	50508-Discipline del settore nutrizionistico e delle altre applicazioni
INDIVIDUAL STUDY (Hrs)	98
COURSE ACTIVITY (Hrs)	52

EDUCATIONAL OBJECTIVES OF THE MODULE

Identify the basic biological structures, organization and functioning of a nerve cell; Distinguish and compare the different adhesion molecules and their role in the biology of the nerve cell; Analyze and interpret mechanisms that regulate the differentiation of the neuronal stem cell; Interpret the reporting mechanisms cellular and their role in the neuronal differentiation process; Distinguish, recognize and interpret the various technologies for the creation of animal models for the study of the most common neurodegenerative diseases.

SYLLABUS

Hrs	Frontal teaching
6	The cellular organization of the nervous system. Cell biology in neurons and glia, organelles and functions.
4	The cytoskeleton and molecular motors in the nerve cell (axonal transport)
2	The blood-brain barrier. structure and functions
2	The biology of ion channels and receptors
8	adhesion molecules and cell-cell communication.
4	New intercellular signaling mechanisms in the nervous system: extracellular vesicles
2	Morphogenesis and neuronal differentiation.
2	The mechanisms of neuronal migration and differentiation, neurogenesis
2	Neuronal stem cells and their possible use in neurodegenerative diseases
4	Technologies for the creation of transgenic models for Neuroscience
4	Genetic and epigenetic basis of the main neurodegenerative diseases
Hrs	Workshops
4	In vitro cell cultures: substrate preparation and cell seeding; Working in the sterile environment.
4	Optical microscopy techniques; Cell count.
4	Fixation and immunofluorescence techniques, notes on confocal microscopy