



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Biomedicina, Neuroscienze e Diagnostica avanzata		
ACADEMIC YEAR	2021/2022		
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)	CONIGLIARO ALICE	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	CONIGLIARO ALICE	Professore Associato	Univ. di PALERMO
	SCALIA FEDERICA	Ricercatore a tempo determinato	Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	CONIGLIARO ALICE Monday 15:00 18:00 Sezione di Biologia e Genetica del Dipartimento BiND in via Divisi 83, oppure attraverso la piattaforma TEAMS. A causa di possibili impegni istituzionali o riunioni di lavoro potrebbe non essere possibile ricevere gli studenti nel giorno e alle ore indicate, pertanto sarebbe preferibile fissare un appuntamento tramite e-mail.		
	SCALIA FEDERICA Monday 14:00 15:00		

PREREQUISITES	<p>Knowledge of the basis of Biology required for access to the Master Degree in Neurosciences.</p> <p>The students must know the main processes regulating cell activity, including DNA duplication, transcription, protein synthesis, cell cycle, mitosis, and meiosis.</p>
LEARNING OUTCOMES	<p>Knowledge and understanding. The student will acquire knowledge and comprehension of the following aspects of cell biology: the molecular bases that govern the main functions of neuronal and glial cells of vertebrates and in particular of man, the communication strategies cell-cell and nerve cell-microenvironment, the molecular bases of neurogenesis and neuronal differentiation, the properties of stem cells and possible applications in regenerative medicine. In addition, the student will acquire knowledge of the cellular and genetic bases of some neurodegenerative diseases. Concerning the study of Human Anatomy, the student will achieve basal knowledge of the human body, position and structure of individual organs. The student will acquire the knowledge of the relationships between the different systems and of the alterations of the anatomical and functional integrity that can cause disease.</p> <p>Ability to distinguish, organize and apply, autonomously:</p> <p>Thanks to the concepts acquired in these subjects, the student in Neurosciences will be able to apply this knowledge to scientific experimentation, on cells of a nervous and stem nature. The basic knowledge acquired is essential for the study of human physiology and for understanding the etiological events that can alter the body's homeostasis and generate disease. In fact, the student will be able to connect the basic functions of the cell to guarantee the physiology of the tissues. The acquired knowledge of the main methodologies of cell biology, and the ability to recognize an organ from its microscopic structure will allow the student to understand and design biomedical applications. Thanks to the didactic 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 with brightfield or fluorescence microscopy, to apply methods for morphological analysis and images acquisition of cellular preparations and fresh tissues.</p> <p>Autonomy of judgement. The student will be able to evaluate and integrate, in an autonomous way, the knowledge acquired in biology and genetics in the study of the nerve cell. he/she will be able to evaluate the implications that the alterations of biological processes have on the main human neurodegenerative pathologies.</p> <p>The student will acquire the ability to analyse and synthesise to form critical thinking about the issues studied for subsequent application in the field of biotechnological methodologies.</p> <p>Communication skills. The student will acquire the ability to communicate and illustrate, simply, even to a non-expert audience, the processes of biology in the study of neuronal differentiation. The student will acquire the ability to describe the human body using appropriate terminology and will be able to interact with other professional figures involved in the diagnostic-therapeutic paths through efficient teamwork.</p> <p>Learning ability. The student will acquire the ability to correctly use the scientific bibliography specific to the sector for a continuous updating of knowledge in the biomedical field and more specifically in neuroscience. He/she will be able to learn and follow appropriately, using the knowledge acquired in the course and the course's subsequent teaching courses. The student will be able to integrate the knowledge of cytology, histology, anatomy, physiology and human pathology to fully understand the complex functioning of the human body and the complex interactions between the different anatomical districts. The student will understand the application and the limitations of biotechnology applied to the biomedical field.</p>
ASSESSMENT METHODS	<p>An oral exam will allow verifying the knowledge acquired in Cell Biology and Human Anatomy. This test aims at ascertaining the acquisition of the skills and knowledge expected by the teaching. The evaluation is expressed out of thirty. 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 processing skills and the possession of adequate exposition skills. However, in the case of serious deficiencies on fundamental topics, the exam can be interrupted even after only one question.</p> <p>The evaluation is expressed as follows:</p> <p>30-30 with honours (cum laude). Excellent knowledge of the contents of the subjects; the student shows high analytical and synthetic skills and can apply his knowledge to solve highly complex problems.</p> <p>27-29. Very good knowledge of the contents of the courses and very good language skills; the student shows analytical-synthetic ability and applies the knowledge to solve problems of medium and, in some cases, high complexity.</p> <p>24-26 Good knowledge of the contents of the courses and good language skills; the student applies the knowledge to solve problems of medium complexity.</p> <p>21-23 Fair knowledge of the contents of the courses, in some cases limited to</p>

	<p>the main topics; acceptable ability to use the specific language of the disciplines and to apply the acquired knowledge autonomously.</p> <p>18-20 Minimal knowledge of the contents of the courses, often limited to the main topics; modest ability to use the specific language of the disciplines and to independently apply the acquired knowledge.</p> <p>Insufficient. Does not possess an acceptable knowledge of the main contents of the subjects. Very little or no ability to use the discipline's specific language and apply the acquired knowledge autonomously.</p>
TEACHING METHODS	Lectures and laboratory activities.

MODULE CELL BIOLOGY <i>Prof.ssa ALICE CONIGLIARO</i>	
SUGGESTED BIBLIOGRAPHY	
<p>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</p> <p>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</p> <p>Reviews on specific topics made available by the professor.</p>	
AMBIT	50508-Discipline del settore nutrizionistico e delle altre applicazioni
INDIVIDUAL STUDY (Hrs)	98
COURSE ACTIVITY (Hrs)	52
EDUCATIONAL OBJECTIVES OF THE MODULE	
<p>Identify the fundamental biological structures, the 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 the mechanisms that regulate the differentiation of the neuronal stem cell; Interpret the cell signalling mechanisms 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.</p>	

SYLLABUS

Hrs	Frontal teaching
6	The cellular organization of the nervous system. Cellular biology of the neuronal and Glial cells (Microglial and macroglial cells): organelles and their function.
4	Cytoskeleton & molecular motors (axonal transport);
2	The Blood-Brain- Barrier: Structure and Functions
2	Biology of ionic channels and receptors
8	Cell Adhesion molecules and cell-cell communication.
4	Novel mechanisms of intercellular communications in Nervous System: the extracellular vesicles
2	Morphogenesis and neuronal differentiation.
2	Mechanisms of neuronal migration and differentiation, neuritogenesis
2	Neural stem cells and their use in neurodegenerative diseases
4	Technologies to create the Transgenic models for Neurosciences
4	Genetic and epigenetic bases of the main neurodegenerative diseases
Hrs	Workshops
4	Cell culture in vitro: substrate preparation and cells seeding; Topic on working in a sterile environment.
4	Microscopy techniques; cell counting.
4	Cells fixation and immunofluorescence; hints of confocal microscopy.

MODULE HUMAN ANATOMY

Prof.ssa FEDERICA SCALIA

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.