



Department of Biomedical Sciences
Physiotherapy Degree Programme
Human Anatomy Course Syllabus

Academic year 2020-2021. Academic term: first semester of the first year
Course coordinator: Dr Marco Rasile

HISTOLOGY (1 ECTS)

Dr Marco Erreni
Graduated in Medical Biotechnology from the University of Milan, he obtained his PhD in Experimental Pathology and Neuropathology. He is currently a researcher at Humanitas Hospital, where he works as an Imaging Technologist at the "Unit of Advanced Optical Microscopy".
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Objectives
This module aims to describe the morphological and structural characteristics of the main tissues of the human body. The general aspects of cells and their organisation in different tissues will be described in relation to their different functions.

Teaching methods
The lectures will be mainly face-to-face, with classroom discussion. During the lectures, questions concerning the course topics will be discussed and answered.

Teaching material
Slides presented during the lectures, available on LMS for physiotherapy students
Martini-Timmons "Anatomia Umana"

Content

1. Epithelial tissues

List the functions of epithelial tissue, the criteria used for its classification, the functions and location of each type of epithelial tissue; describe the types, structural and functional characteristics of the lining epithelia; describe the main structural characteristics of the epidermis and dermis, and their functional importance; list and describe the types, structural and functional characteristics of glandular epithelia.

2. Connective tissue and cartilage

List and describe the three groups of connective tissue and their general functions. Describe the structural and functional characteristics of the extracellular matrix; describe the fibrillar component (collagen and elastic fibres); describe the cellular component of connective and cartilaginous tissues, distinguish between resident and transient cells; describe how connective tissue forms the framework of the body; list and describe cartilaginous tissue: structure and functions of different types of cartilage.

3. Bone tissue

Describe the general structure of bone; analyse and describe the histology of lamellar bone tissue; describe the cellular components of bone tissue; evaluate and compare the processes of bone development and growth (bone histogenesis and ossification processes); describe the different types of fractures and explain their mechanism of repair and bone remodelling.

4. Muscle tissue

Describe the general characteristics of muscle tissue; describe the structural and functional

characteristics of skeletal muscle tissue: describe the mechanisms of contraction and relaxation of muscle tissue; define the motor unit and explain its control by a single motor neuron; describe the structural and functional characteristics of cardiac muscle tissue; describe the structural and functional characteristics of smooth muscle tissue.

5. Adipose tissue

Describe the general characteristics of adipose tissue; describe the structural and functional characteristics of white adipose tissue; describe the structural and functional characteristics of brown adipose tissue.

6. Blood

Describe the composition of blood and the processes of haematopoiesis and erythropoiesis; list the cells that represent the cellular component of blood and describe their main characteristics and functions; describe the process of haemostasis.

7. Lymphoid organs

Describe the structural and functional characteristics of lymphoid organs; list the different lymphoid organs: spleen, thymus, lymph nodes and tonsils; describe the structural and functional characteristics of mucosa-associated lymphoid tissue (MALT).

8. The endocrine system

Describe the structural and functional characteristics of the endocrine glands; describe the organs that make up the endocrine system, their structure and function.

9. Introduction to nervous tissue

Describe the general organisation of the nervous system; describe the morphology of nerve cells and their functional and structural characteristics; describe synapses and the transmission of electrical and chemical signals between neurons; describe the cellular non-neuronal component: characteristics and functions of glial cells; describe the structure and function of the blood-brain barrier.

ANATOMY OF THE MUSCULOSKELETAL SYSTEM (2 ECTS)

Dr Lara Castagnetti	Lara Castagnetti - Surgeon, specialist in Physical Medicine and Rehabilitation, and osteopath. She works at the Department of Rehabilitation and Functional Recovery - Orthopaedic Rehabilitation at Humanitas Hospital in Rozzano. E-mail: lara.castagnetti@humanitas.it
Objectives	The module aims to provide basic knowledge on musculoskeletal anatomy, necessary to learn physiotherapy techniques applied to this apparatus. The learning objective is also directed towards understanding the functional aspects of each musculoskeletal sub-system.
Teaching methods	Lectures with classroom discussion. At the end of each lecture there will be time dedicated for students to interact with the lecturer and discuss about anatomical-functional aspects that are most relevant in a physiotherapists' daily practice.
Teaching material	Lecture slides Martini, Timmons, Tallitsch "Anatomia Umana" – EdiSES; Andrew Biel Guida ai sentieri del corpo- Eserciziari pratico per l'apprendimento Edi-ermes
Content	

1) Introduction to Anatomy and Classification of Bones

The language of anatomy, recall of regional and directional terminology in the anatomy of the locomotor apparatus. Description and terms of movement of the different body segments. Morphological classification of bones. Surface characteristics of bones.

2) Classification of joints and muscles

Classification of joints morphology and function. Accessory structures of joints. Typology of joint movement. Morphology and functional classification of muscles.

3) The skull

Bones of the skull, bones of the splanchnocranium, orbital and nasal complexes, the skull of the newborn. Head muscles (mimic, orbital, mastication, tongue)

4) The spine

Spine curvatures, vertebral arches and spinous processes, vertebral joints

Vertebral regions and different types of vertebrae

Sacrum and coccyx. Neck muscles. Superficial, intermediate and deep layers of the intrinsic muscles of the back, spinal flexor muscles

5) Descriptive and topographical anatomy of the chest wall, diaphragm

Anatomical-functional considerations with reference to respiration. Description of the pillars, central tendon, insertions. Relationship with abdominal and thoracic organs. Relationship with the aorta, inferior vena cava, oesophagus. Role in respiration.

6-7) Descriptive and topographical anatomy of the abdominal wall

Anatomical-functional considerations of the abdominal wall, with reference to its relationship with intra- and extraperitoneal abdominal organs

8) Pelvic cavity and perineum

Description of the pelvic bone sections, their relationships and functional significance. Musculature of the pelvic cavity and perineum. Pelvic fascia, superficial and deep perineal. Anatomical-functional considerations and relationships with digestive and urogenital apparatus. Integral theory of the pelvic floor.

9-10) Appendicular skeleton - upper limb

Description of the bone, joint and muscular structures of the shoulder girdle and upper limb. Description of vascular, nervous and lymphatic structures and their anatomical relationships.

11-12) Appendicular skeleton - lower limb

Description of the bone, joint and muscular structures of the pelvic girdle and lower limb. Description of vascular, nervous and lymphatic structures and their anatomical relationships.

ANATOMY OF THE NERVOUS SYSTEM (2 ECTS)

Dr Marco Rasile

PhD in Morphological Sciences, currently researcher at the Laboratory of Pharmacology and Pathology of the Nervous System - Humanitas Clinical and Research Center.

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Objectives	Acquire terminology useful in the health profession for effective communication in the field of anatomy and physiology. Recognize anatomical structures in order to contextualise the knowledge acquired in the physiology course. Use knowledge of anatomy to predict physiological consequences. Correct interpretation of anatomical illustrations. Describe, draw and list the main features of the nervous system.
Teaching methods	Lectures, case studies, watching video-clips, practical exercises
Teaching materials	Lecture slides Martini, Timmons, Tallitsch - Anatomia Umana – EdiSES S.G. Waxman – Neuroanatomia Clinica – Piccin
Content	
<p>1) Embryogenesis and general aspects of the CNS The student should acquire sufficient information on embryological development to be able to understand its implications in the organisation of the structures of the adult nervous system with particular reference to: Cellular components and major divisions (functional and anatomical) of the nervous system; directional terms of the brain; neurulation, subdivisions of the brain (brain vesicles); development of the fourth ventricle; characteristics of the nervous system</p>	
<p>2) Spinal cord and reflexes The student should understand the relationship between the structure of the spinal cord and its characteristics in physiological and pathological contexts, with particular reference to: development of the spinal cord; organisation, longitudinal and transverse divisions, distribution of white and grey matter; reflex and integrated responses; somatotopy; Rexed classification; spinal cord coatings; description of the six main nerve plexuses</p>	
<p>3) Forebrain: ventricles and their linings The student should create a mind map of the location and names of the main parts of the forebrain, with particular reference to: anatomical and functional description of the supraxial organs; brain meninges; anatomical and functional description of the cerebral cortex (primary motor and sensory cortices in particular); organisation of the forebrain; internal cavities of the central nervous system and CSF circulation</p>	
<p>4) Vascularisation of the brain The student should be able to outline the cerebral arterial vascular territories and know the specific vocabulary and understand the specific related lexical area, arterial vascularization of the forebrain and hindbrain; venous drainage of the brain; blood brain barrier</p>	
<p>5) Brainstem, cerebellum The student must know the nomenclature and be able to indicate the different structures in illustrations, with particular reference to: the structure of the brainstem; the anatomical location and description of the main functions of the brainstem nuclei; the role of the reticular activating system and its significance in maintaining the state of consciousness.</p>	
<p>6) Cranial nerves and neural pathways The student should become familiar with the topography of the ascending and descending tracts with particular reference to: cranial nerves; composition of the sensory and motor pathways; identification and description of the lateral, medial and cortico-spinal systems and their decussation characteristics</p>	

<p>7): Movement control The student should understand the modulation of movement by the supralaxial nerve centres considering the nerve centres responsible for movement; the relationship between motor neurons and muscles; modulation of movement by the basal ganglia and cerebellum.</p> <p>8) Autonomic nervous system The student should create a mind map of the location and names of the main constituents of the autonomic nervous system, with particular reference to: anatomical and functional description of the autonomic nervous system; levels of integration and control of the autonomic nervous system</p> <p>9) Specific senses: smell, taste, hearing The student will have to create a mind map of the position and names of the main anatomical constituents responsible for specific senses, with particular reference to: general and specific senses; anatomical and functional description of the nerve pathways of specific senses (taste, smell, hearing and sight); anatomical description of the structures inside the ear and along the auditory pathway (vestibular system and auditory system); anatomical and functional description of the nerve pathways of visual senses; layers of the eye and functions of the anatomical structures within each layer</p>

SPLANCHNOLOGY AND THE CARDIOVASCULAR SYSTEM (2 ECTS)	
Dr Silvia Oldani	Specialist in Internal Medicine and Nephrology, works in the Emergency Medicine department at Humanitas hospital in Rozzano. Since 2007 she has been working at the Office of Medical Education as Head of Vocational activities. She has been teaching human anatomy for the Nursing Degree Programme since 2008, the Medicine Degree Programme in English since 2015, and the Physiotherapy Degree Programme since 2016. E-mail: silvia.oldani@humanitas.it
Objectives	Learn the general principles of body composition, with particular emphasis on the structural/functional relationship and functional anatomy of the cardiovascular system. This is in preparation for the understanding of physiology and clinical science and to provide a rational basis for studying physiology and pathology.
Teaching methods	The module consists of lectures
Teaching material	Lecture slides Martini-Timmons -Tallitsch “Anatomia Umana”- EdiSes
Content	
<p>1) General aspects and areas of the body Know the general body composition: the human body as a whole and the identification of its constituent parts. Understand and correctly use anatomical and directional terminology.</p> <p>2) Respiratory system Know the shape and location of the organs of the respiratory system and the main structural features that underline their functions: connections between respiratory muscles, thoracic skeleton, rib joints, composition of the pleural space and structure of the lung parenchyma; anatomical bases of phonation; structure of air-blood barrier</p> <p>3) Digestive system</p>	

Know the shape and location of the organs of the digestive system and the main structural features that underline their functions: illustrate the architecture and structure of the mouth cavity, the morphology of teeth and of the dental alveoli joints; define the anatomical mechanism of mastication and swallowing; illustrate the architecture and structure of the digestive tract, highlighting the anatomical basis of digestion, both from an enzymatic and mechanical point of view; highlight the involuntary and voluntary mechanisms of emptying the abdominal viscera, with links to the large muscles of the abdomen (thoracic and abdominal muscles); illustrate the liver with particular reference to the morphology and function of the hepatic lobule; describe the portal vein and its collateral circulation: functional considerations; describe the extrahepatic bile ducts.

4) Genitourinary system

Know the shape and location of the organs of the genitourinary apparatus and the main structural characteristics that underline their functions, illustrate gametogenesis and compare the timing and modalities in the two sexes; describe the stages of spermatogenesis; describe the ovarian cycle and the uterine cycle and their interconnections.

5) Cardiovascular system

Anatomical and functional aspects of the cardiovascular apparatus: external configuration of the heart, anatomical relations and positioning in the thorax; internal configuration of the cardiac cavities; structure and anatomical-functional aspects of the fibrous skeleton and cardiac valves; pathway and functional aspects of the conduction system; vascularisation of the heart; structure and function of the pericardium; radiological anatomy of the cardiac shadow

6) Cardiovascular system: Vascular layout

Where large vessels arise and relations with the structures of the thorax; general organisation of the vessels pathways; functional and trophic pulmonary circulation; arterial and venous vascularisation of the body cavities, skull and limbs; organisation of the lymphatic system

Examination for the Human Anatomy course. Written examination with multiple-choice questions on topics from all modules and oral examination on locomotor system anatomy and nervous system anatomy modules (Chairman of the Examination Committee: Dr. Marco Rasile)