



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Medicina di Precisione in area Medica, Chirurgica e Critica
ACADEMIC YEAR	2024/2025
MASTER'S DEGREE (MSC)	DENTISTRY
INTEGRATED COURSE	GENERAL AND APPLIED HISTOLOGY - INTEGRATED COURSE
CODE	13579
MODULES	Yes
NUMBER OF MODULES	2
SCIENTIFIC SECTOR(S)	BIO/17
HEAD PROFESSOR(S)	LA ROCCA GIAMPIERO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	LEONE ANGELO Professore Associato Univ. di PALERMO LA ROCCA GIAMPIERO Professore Associato Univ. di PALERMO
CREDITS	8
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	1° semester
ATTENDANCE	Mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	LA ROCCA GIAMPIERO Wednesday 11:00 12:30 Plesso di Anatomia e Istologia, Dipartimento BiND, Policlinico Universitario LEONE ANGELO Wednesday 10:00 12:00 BiND, sezione di Anatomia e Istologia, piano 1°

<p>PREREQUISITES</p>	<p>Basic concepts about Chemistry, Biochemistry, Molecular and cellular biology already acquired. Furthermore, in relation to the 8 key competences established by the Council of the European Union "COUNCIL RECOMMENDATION of 22 May 2018, the following most relevant competences are identified based on the educational objectives of the Histology and Embryology course:</p> <ul style="list-style-type: none"> - Literacy competence; - Multilingual competence; - Mathematical competence and competence in science, technology and engineering; - Cultural awareness and expression competence
<p>LEARNING OUTCOMES</p>	<p>Knowledge and comprehension ability Acquisition of the histological and embryological terminology as base of the communication and interpretation of the morphological sciences.</p> <p>Ability to apply comprehension and knowledge Intellectual ability to the diagnostic of the four categories of normal human tissues, with special focus on orofacial structures and teeth-specific tissues, with adequate knowledge of the embryological development steps also referring to clinical embryology.</p> <p>Judgement autonomy To be adequate in integrating the morphological knowledge and applying the information to the morphofunctional scientific research. Moreover, acquire critical capacity in data evaluation and in the information panorama of morphology.</p> <p>Communication skills Clear comprehension of the aims of the global knowledge, demonstrating a critical development of the dimensions of listening, as well as clear and effective communication.</p> <p>Learning skills To be able to adequately formulate autonomous judgements. Be able to develop paths leading, also with links with other scientific subjects, to a wider horizon in the morphological data interpretation.</p>
<p>ASSESSMENT METHODS</p>	<p>Oral Exam</p> <p>A – A+ Excellent 30-30 e lode Excellent knowledge of the contents of the subject; the student shows a high capacity to analyze and synthesize concepts. The student is able to apply the knowledge to solve highly complex problems.</p> <p>B Very good 27-29 Very good knowledge of the contents of the subject and language ability. linguaggio; the student shows a high capacity to analyze and synthesize concepts and can apply the acquired knowledge to the resolution of medium complexity problems, and in some cases also elevated complexity ones.</p> <p>C Good 24-26 Good knowledge of the subject and language skills. The student can apply the acquired concepts to solve medium difficulty problems.</p> <p>D Satisfactory 21-23 More than sufficient knowledge of the subject, even if somewhat limited with regards to the details of notions. Satisfactory ability in the use of the subject-specific language. The student can autonomously apply the acquired information.</p> <p>E Sufficient 18-20 Minimal knowledge of the subject, often limited to the main topics. Limited ability in using the subject-specific language. Limited ability in the autonomous application of the acquired knowledge.</p>

	<p>F Fail</p> <p>The student has not developed a sufficient knowledge of the main aspects of the subject. Very limited or absent ability to use the subject-specific language. Very limited ability in applying the acquired knowledge.</p> <p>“Compensatory tools and dispensatory measures will be guaranteed by the Disability and Neurodiversity Center - University of Palermo (Ce.N.Dis.) to students with disabilities and neurodiversity, based on specific needs and in implementation of current legislation.”</p>
TEACHING METHODS	Frontal lessons

**MODULE
GENERAL HISTOLOGY AND EMBRYOLOGY**

Prof. ANGELO LEONE

SUGGESTED BIBLIOGRAPHY

AA.VV. Istologia Umana, Idelson Gnocchi, 2020 ISBN 9788879477253
 Moore, Persaud, Torchia: Embriologia. L'Essenziale, Before we are born. Piccin 2023 ISBN 9788829933266
 AA.VV. Istologia Monesi, Idelson Gnocchi, 2019 ISBN 9788829928132
 AA.VV. Embriologia umana, Piccin ISBN 9788829933266

AMBIT	50447-Morfologia umana, funzioni biologiche integrate degli organi ed apparati umani
INDIVIDUAL STUDY (Hrs)	75
COURSE ACTIVITY (Hrs)	50

EDUCATIONAL OBJECTIVES OF THE MODULE

Having acquired knowledge about the ecosystem of biological cells and the organisation of major tissues, and having understood the evolution of the various phases of human embryonic development both descriptively and in relation to the molecular mechanisms that direct and modulate the stages of prenatal development, you are now invited to participate in our new educational initiative. As part of our educational activities, artistic workshops dedicated to the study of anatomical and histological drawing will be initiated. These workshops represent a significant tool for the learning of morphological sciences, as they allow for a deeper understanding of anatomical and histological structures through observation and graphic reproduction. This integrative approach fosters greater familiarity with various morphological components, enhancing the ability to recognise and interpret the complexities of biological structures. Therefore, we highly recommend full participation and commitment to these activities, as they constitute an essential complement to both theoretical and practical training in the field of morphological sciences.

SYLLABUS

Hrs	Frontal teaching
2	Introduction to Morphological Science with particular emphasis to the microscopic Anatomy
3	1 / I. MEANS AND METHODS History of Histology and its study methods: the first means of investigation until light microscope. The optical microscope: the 'parts' of the optical microscope. the light microscope limits. The diffraction of light and Hairy discs. Width of the circular visual. The fluorescence microscope. The confocal laser microscope. The microscope in phase contrast. The polarizing microscope. The electron microscope: basic structure of the electron microscope. Resolving power theoretical and real. Technical set-up of the slides: the fixation to the inclusion. Artifacts. The dyes: classifications. Property 'of the dyes; factors influencing the activity of the dyes. Theories about the mechanism of coloration. Techniques of construction of sections: microtome, ultramicrotome, cryostat. The histochemical and cytochemical methods: general histochemical techniques. Smear of blood. Immunohistochemistry: application of the revelation of the peroxidase immunohistochemical techniques.
6	2 / I . CYTOLOGY Cell doctrine. Syncytia and plasmodia. Cell differentiation. General architecture of the cell morphology. The physical and chemical characterization of the cell: the inorganic and organic components. Cellular metabolism and vital manifestations of the protoplasm . The structural and ultrastructural morphological characterization of the cell : the cytoplasmic membrane unit: ultrastructure and function of the plasmatic membrane; plasmatic membrane morpho - functional differentiations . The devices microcavity cytoplasmic : ultrastructure and functions of the endoplasmic reticulum, mitochondria, lysosomes, peroxisomes, Golgi complex. The macromolecular characterization of cellular constituents : Pattern microtrabecular and cytoskeleton .

20	<p>3 / I. Histology Tissues. Organs. Systems. Classification of tissues. Epithelial tissue: classification and morphofunctional considerations of epithelia: lining epithelia, sensory, secreting. The units' secreting cell, exocrine glands, the endocrine glands (classification and structural organization). The hypothalamus-pituitary system. The diffuse neuroendocrine system. The connective tissue: classification and morphological and functional considerations. The cells and the extracellular matrix: macromolecular and functional considerations. The mesenchyme. The connective tissues; cartilaginous tissue; the bone tissues; blood, tissues and bloodforming organs. The contractile tissues: smooth muscle, skeletal striated muscle tissue, cardiac striated muscle tissue. Nervous tissue: evolution of the study concerning neuron and investigative procedures. The neuron as entities' morphological: number and size of neurons; shape of the neurons; classifications; structure and ultrastructure of the neuron components (the membrane of the neuron, the pirenoforo, the tigoide substance, neurotubules and neurofilament, the dendrites, the neuritis, the nerve fiber). Ways of neuron connection: central and peripheral nerve endings. electrical synapses. chemical synapses and their mode of nerve impulse transduction. endocytotic recycling. The neuron as cytochemistry entities . Glia: generalities. Glia of the CNS: ependyma, macroglia, oligodendroglial, microglia, pituicytes, Müller cells, gliocytes</p>
4	<p>EMBRYOLOGY 1 / E. GENERALITY Introduction: meaning and development of Embryology. The various stages of embryonic development, embryo-fetal measurements. embryo-fetal anatomy: description of the various parts of embryo and fetus. Determination and sex differentiation: differentiation of gonads. Primordial germ cells. The development of the male and female gonads. The development of the sperm tracts and of the genital organs. Generality on male genitalia: The testicular unit: The Didymus, epididymis, the seminiferous tubule and Leydig cells. The sperm ducts. The neurohormonal control of male gonadali functions. Generality female genitalia: the united and ovarian folliculogenesis pre-postpubertal; the fallopian tube; the uterus; the vagina. The neurohormonal control of female gonadali functions. The male gamete: the seminiferous epithelium cycle. The cells of the seminal line. Spermatogonia. Spermatocytes. Spermatids. The spermiostogenesis. The sperm. abnormal sperm. The female gametogenesis: oogenesis and projection in the ovarian cycle, uterine and vaginal.</p>
6	<p>2 / E. FERTILIZATION AND EMBRYONIC FIGURES Fertilization: meaning of fertilization. The journey of the sperm through the male genital tract. Maturation and motility sperm. The emission of sperm. The sperm or semen. The sperm capacitation. Vitality 'sperm. Route and vitality oocyte. Phenomenology of fertilization: the acrosome reaction, sperm penetration in ovules, of the oocyte activation, cortical reaction. Zygote formation. IVF: general information. Segmentation: from morula to blastula. Types of egg. Types of segmentation. Segmentation in placental mammals. Development programming. Control of the early stages of development by maternal genetic programs. Transition from mother's program to the embryo. Control of the embryonic development program. Blastogenesis (Nesting and decidual reaction). Gastrulation: the meaning of gastrulation. Gastrulation in placental mammals. cytoskeletal mechanisms during morphogenesis. germ layers. Coordinating cytoskeletal and intercellular signals during gastrulation. The neurulation: meaning and organizational commitment.</p>

6	3 / E. MORPHOGENESIS And HISTOGENESIS Embryonic development and morphogenesis in humans: induction (endogenous and exogenous inducers, the primary and secondary., Interactions, organizers), Determination, morphogens, Stem Cells. The first week of development (segmentation). The second week of development (preparation for gastrulation). The third week of development (gastrulation). The fourth week of development (secondary morphogenesis). From fifth to thirtyeighth week of development. Histogenesis. The evolution of the germ layers: introduction. ectodermal derivatives. entodermici derivatives. mesodermal derivatives. The fetal membranes: introduction. The embryonic annexes in placental mammals. The fetal membranes (embryofetal) in humans.
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Hrs	Others
3	Artistic Drawing Workshop of Histological Structures

**MODULE
ORAL HISTOLOGY AND EMBRYOLOGY**

Prof. GIAMPIERO LA ROCCA

SUGGESTED BIBLIOGRAPHY

Ten Cate: Istologia Orale, Piccin, ISBN: 9788829903474

Moore, Persaud, Torchia. Embriologia. L'essenziale. Before we are born. Piccin 2023, ISBN: 9788829933266

AMBIT	50447-Morfologia umana, funzioni biologiche integrate degli organi ed apparati umani
INDIVIDUAL STUDY (Hrs)	45
COURSE ACTIVITY (Hrs)	30

EDUCATIONAL OBJECTIVES OF THE MODULE

Acquire the concepts about the bioarchitecture of the cell, and the organization of the tooth tissues ; to know the evolution of the various phases of human tooth development both in the field of descriptive and on the relationship with the molecular movements that direct and modulate the various stages of prenatal and postnatal teeth development .

SYLLABUS

Hrs	Frontal teaching
2	Generalities on the development of the oral structures and correlation with the pre-implant and post-implant phases of human development.
3	Head and Neck development, pharyngeal gut development, pharyngeal arches, pouches and grooves. Derivatives of the pharyngeal gut
4	Development of orofacial structures: Facial development and its defects. Palate development. Development of nasal cavities and septum. Tongue development.
4	Odontogenesis: Development of the dental lamina and dental fields, genetic regulation, molecular movements, stages of teeth development; Root development; Deciduous teeth eruption; definitive teeth eruption
7	Teeth tissues: Enamel; Matrix formation and mineralization; Maturation of enamel, structures in mature enamel, microscopic and morphofunctional aspects Dentin: Dentinogenesis, types of dentin, defects in dentin formation, microscopia and morphofunctional aspects Dental pulp: Embryologic origin, cell types in dental pulp, dental pulp stem cells, vascular and nervous structures, microscopic and morphofunctional aspects
5	Parodontum: Cementum: embryologic origin, classification and distribution, relationships with other dental tissues. Parodontal ligament. Alveolar bone
5	Gingiva and junctions between teeth and gingiva. Morpho-functional features of the junctional epithelium. Oral cavity and facial structures: 1)Glands; 2) Lymphoid structures; 3) Nasal cavities and paranasal sinuses Oral mucosa: Structure, regional differences in oral mucosa, pigmentation of oral mucosa, renewal, repair and aging of oral mucosa