DESCRIPTION OF COURSE UNIT FOR DOCTORAL STUDIES AT VILNIUS UNIVERSITY

Scientific Area/eas, Field/ds of Science	Medical and Health Sciences (M 000): Medicine (M 001); Dentistry (M 002); Public Health (M 004)			
Faculty, Institute, Department/Clinic	Faculty of Medicine Institute of Biomedical Sciences Department of Anatomy, Histology and Anthropology			
Course unit title (ECTS credits, hours)	**Tissue Morphology and Histophysiology** 10 credits (265 hours)			
Study method	**Lectures**	**Seminars**	**Consultations**	**Self-study**
Number of ECTS credits	-	-	1	9
Method of the assessment (in 10 point system)	Presentation of the report: the report is presented on a chosen topic, which is coordinated with the coordinating lecturers. The doctoral student must analyze, review and present the newest scientific publications related to the relevant topic. Evaluation criteria: - novelty and relevance of the submitted material (2 points); - general structure and scope of the report, clear presentation of the knowledge, argumentation, conciseness and specificity (2 points); - summary, problematic issues, presentation and justification of conclusions (2 points); - presentation of the application of the reviewed knowledge in the dissertation (2 points); - organization of visual aids, ability to participate in discussion, control of questions, oratory skills (2 points). The minimal positive score is 5.			

PURPOSE OF THE COURSE UNIT

To provide new knowledge on the structure, origin, functions of human body tissues, based on modern research, emphasizing the close and varied relationship between tissue origin, structure and function, interrelationships and position of tissues in organs, age related changes, clinical significance of tissues and organ structure. To promote interest and deepening in the microscopic structure of the human body and the application of the acquired knowledge in solving the interdisciplinary problems of doctoral topics in various fields of science.

THE MAIN TOPICS OF COURSE UNIT

Histogenesis. Structural components of tissues, their morphological and functional classification, sources of origin. Peculiarities of tissue formation in phylogenesis and ontogenesis. Physiological and reparative regeneration. Stem cells, their properties, types, use for scientific purposes, possibilities of clinical application. Cell determination and differentiation. Tissue variability and metaplasia. Significance of apoptosis and necrosis for histogenesis and variability.

Epithelial tissue, its morphological and functional characteristics, clarification and regenerative possibilities. Superficial epithelia, specialized structures of the apical, basal and contact domains of epitheliocytes. Classification, location, structural features, functions, histogenesis of simple and stratified epithelial tissues. Glandular epithelium, glands, their classification. Location, structural features, functions and histogenesis of glandular epithelia.

Connective tissue, morphological and functional characteristics, classification. Embryonic connective tissues, structure and functions of structural components,

location, histogenesis. Connective tissue proper, morphological and functional characteristics, classification, histogenesis. Structure and functions of extracellular material, ground substance and fibers, fibrillogenesis. Types of collagen and their functional significance. Collagenopathies and their clinical manifestations. Loose connective tissue, its location, functions, resident and migrating cells, components of the extracellular material, origin, structure, functions. Mononuclear (macrophage) phagocytic system, its cells, their structure and functions. Dense connective tissue, its classification, structural features, location, functions. Specialized connective tissues, structural and functional characteristics. Adipose tissue, its types, structure, functions, significance for the metabolism. Reticular connective tissue, its structural features, location, functions. Skeletal tissue, morphological and functional characteristics. Cartilages, their classification. Types of cartilage cells, structure and functional features of extracellular material. Chondrogenesis, types of cartilage growth, regenerative possibilities. Perichondrium, its importance for cartilage nutrition, growth and regeneration. Location, structural features and functions of hyaline, elastic and fibrous cartilage. Bone tissue, its types, age related changes. Bone cell types, structure, physical and chemical properties of extracellular material. Bone tissue regeneration and remodeling. Periosteum, its structure, functional significance. Development of bones, characteristic and peculiarities of intramembranous and endochondral ossification. Clinical manifestation of congenital and acquired disorders of osteogenesis.

Blood and lymph. Classification, structure, functions of blood components. Structural and functional features of polymorphonuclear and mononuclear leukocytes. Embryonic and postembryonic hematopoiesis, features and peculiarities of erythropoiesis, granulocytopoiesis, monocytopoiesis, lymphocytopoiesis and megakaryocytopoiesis. Lymph components, their functional significance.

Muscle tissue, morphological and functional characteristics, classification, regenerative possibilities. Smooth muscle, its structural and functional features, histogenesis. Skeletal muscle, its structural and functional features, histogenesis. Skeletal muscle fiber, its structure, mechanism of contraction apparatus. Types of skeletal muscle fibers. Myosatellite cells, their role in regeneration. Clinical manifestation of changes in the structure of skeletal muscle tissue. Cardiac muscle, peculiarities of structure and function, histogenesis. Morphological and functional characteristics of contractile and conductive cardiomyocytes.

Nerve tissue, morphological and functional characteristics, neurulation, histogenesis. Clinical manifestations of disorders of neurulation, neuronal migration, proliferation and maturation processes. Structural components of nerve tissue. Neurons, their morphological and functional classification, structure. Neuroglia, its classification, structural features, functions. Nerve fibers, their structural and functional types. Formation, structure and functional features of myelinated and non-myelinated fibers. Clinical manifestation of disorders of the myelination process. Possibilities of neuronal regeneration. Interneuronal synapses, classification, structure. Effector and receptor nerve endings, their classification, structure, functions.

RECOMMENDED LITERATURE SOURCES

1. Pawlina W., Ross M.H. Histology. A Text and Atlas: With Correlated Cell and Molecular Biology. Wolters Kluwer, 8th Edition, 2020: *https://www.amazon.com/Histology-Atlas-Correlated-Molecular-Biology/dp/1496383427*
2. Mescher A.L. Junqueira's Basic Histology: Text and Atlas. McGraw-Hill Education, 16th edition, 2021:

https://www.amazon.com/Junqueiras-Basic-Histology-Atlas-Sixteenth-ebook-dp-B08R121B45/dp/B08R121B45/ref=mt_other?_encoding=UTF8&me=&qid=

ONLINE:

3. Kierszenbaum A. Histology and Cell Biology: An Introduction to Pathology. Elsevier, 2020: *https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20180013341?indexOverride=GLOBAL*
4. Lowe J.S., Anderson P.G., Anderson S.I. Stevens & Lowe's Human Histology. Elsevier, 5th edition, 2020: *https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20170016105?indexOverride=GLOBAL*
5. Gartner L. P. Textbook of Histology. Elsevier, 5th edition, 2021: *https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20140021375*
6. Mescher A.L. Junqueira's Basic Histology: Text and Atlas. McGraw-Hill Education, 15th edition, 2018: *https://accessmedicine.mhmedical.com/book.aspx?bookid=2430*
7. Young B., O'Dowd G., Woodford P. Wheater's Functional Histology: a Text and Colour Atlas. Churchill Livingstone, 6th edition, 2014: *https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20090600258b*
8. Ash J., Morton D., Scott S. Histology: The Big Picture. McGraw-Hill Education, 1st edition, 2013: *https://accessbiomedicalscience.mhmedical.com/book.aspx?bookID=2058*
9. S.Standring (ed.). Gray's Anatomy. Elsevier Limited, 42nd edition, 2021: *https://www.clinicalkey.com/#!/browse/book/3-s2.0-C20170037291*
10. Histology Guide. Virtual microscopy laboratory: *https://histologyguide.com/*

CONSULTING LECTURERS

1. Coordinating lecturer: Renata Šimkūnaitė - Rizgelienė (Prof. Dr.).
2. Violeta Žalgevičienė (Prof. Dr.).
3. Ramunė Čepulienė (Assoc. Prof. Dr.).

APPROVED:

By Council of Doctoral School of Medicine and Health Sciences at Vilnius University: 29th of September 2022

Chairperson of the Board: Prof. Janina Tutkuvienė