CONTENT OF THE SUBJECT

Subject:	**Histology and embryology 1**		
Study	*General medicine*	**Study Period:**	*1st year Summer time*
Evaluation:	*Absolved (A-E)*	**Subject Type:**	*Compulsory*
Content:	*2 h lectures and 3 h practical exercises / week*		*Total 28/42 hours*

Department: **Department of Histology and Embryology, UPJŠ FM**

Week	***Lectures*** **http://portal.lf.upjs.sk**	***Practical lessons***
1.	**Introduction to the histology** **Cytology** Structure and biochemical composition of the cell membrane. Function of the cell membrane. Cytoplasm and nucleus. Cell organelles, cytoplasmic inclusions, cytoskeleton.	**Histological techniques** Tissue sampling, fixation, dehydration, paraffin and celloidin embedding. Microtomes. Staining – principle. HE staining. Histochemistry. Immunohistochemistry. Light and electron microscopy.
2.	**Epithelial tissue I** Classification and characteristic features of epithelial tissue. Polarity of epithelial cells. Intercellular junctions – classification and basic characteristics. Basement membrane	**Functional cytology** Microscopic structure of cells producing proteins, steroids, mucus and ion-transporting cells. **The size and shape of the cells** ganglion spinale – round cells medulla spinalis – star-shaped cells cerebellum – pear-shaped cells intestinum tenue (jejunum) – goblet cells
3.	**Epithelial tissue II** Glandular epithelium: endocrine and exocrine, classification, types of exocrine secretion. Secretory portion and duct system – structure and function. **Introduction to connective tissue** Main characteristics of connective tissues. Classification and composition of connective tissues.	**Epithelial tissue I** pulmo – simple squamous epithelium ren – simple cuboidal epithelium vesica fellea – simple columnar epithelium with microvilli
4.	**Connective tissue** Connective tissue proper, connective tissues with special properties. Composition - cells, amorphous ground substance, types of fibers. Function and location	**Epithelial tissue II** epididymis – pseudostratified columnar epithelium with stereocilia trachea – pseudostratified columnar ciliated epithelium ureter – transitional epithelium vagina – stratified squamous nonkeratinized epithelium cutis – stratified squamous keratinized epithelium
5.	**Cartilage** Characteristic features of the cartilage. Cartilage cells and extracellular cartilage matrix. Perichondrium. Types of cartilage, function, histophysiology, regeneration. Microscopic structure of the articular cartilage.	**Connective tissue I** cutis, papillary layer – loose connective tissue cutis, reticular layer – dense connective tissue irregular tendo – dense connective tissue regular

6.	**Bone tissue I** Characteristic features of the bone tissue. Bone tissue cells, bone matrix. Primary and secondary bone tissue. Microscopic structure of compact and spongy bone tissue. Periosteum, endosteum.	**Connective tissue II** aorta/arteria elastica – elastic tissue nodus lymphaticus – textus reticularis – reticular tissue textus adiposus – adipose tissue funiculus umbilicalis – mucous tissue
7.	**Bone tissue II** Endochondral and intramembranous ossification.	**Cartilage** trachea – hyaline cartilage epiglottis – elastic cartilage cartilago fibrosa – fibrocartilage
8.	**Muscle tissue** Striated skeletal muscle tissue - origin, microscopic structure and function. Microscopic structure of myoneuronal junction. Cardiac muscle tissue and smooth muscle tissue - origin, microscopic structure and function.	**Bone tissue** textus osseus primarius – primary bone tissue textus osseus – secondary compact bone tissue ossificatio (epiphysis) – secondary spongy bone tissue.
9.	**Nerve tissue** Neuron (structure and ultrastructure) and its processes – dendrites and axon. Synapses. Mediators. Myelination. Classification of neurons. Hematoencephalic barrier. Neuroglial cells – astrocytes, oligodendrocytes, microglial cells, ependymal cells.	**Ossification** intramembranous ossification of the flat bones ossificatio (epiphyseal plate) – endochondral ossification
10.	**Blood and haematopoiesis** Composition of the blood. Microscopic structure of blood formed elements (erythrocytes, leukocytes and thrombocytes). Erythropoiesis. Microscopic structure and function of the bone marrow.	**Muscle tissue** lingua – skeletal muscle tissue myocardium – cardiac muscle tissue intestinum tenue (jejunum) – smooth muscle tissue
11.	**Embryology I** Introduction to embryology. The role of embryology in medicine. Gametogenesis, fertilization, zygote, morula, blastocyst.	**Nerve tissue** medulla spinalis – nerve cells, ependymal cells (Nissl staining) cerebrum – glial cells (silver impregnation) cerebellum, medulla spinalis – astrocytes (GFAP immunohistochemistry)
12.	**Embryology II** Implantation. Decidual reaction and decidua. Development of the placenta. Placental barrier. Development of fetal membranes (chorion and amnion)	**Blood and bone marrow** sanguis – blood smear – red and white blood cells, platelets. textus osseus – red bone marrow ossificatio (epiphysis) – red and yellow bone marrow
13	**Embryology III** 3. and 4. week of embryonic development. Gastrulation. Primitive organs of the embryo. Folding of the embryo.	**Repetition of tissues**
14.	**Semestral written test**	**Semestral slide test**