Faculty of Dentistry

Cytology, embryology, histology

Syllabus

Spring semester

EDUCATIONAL PROGRAM (SILLABUS) on the subject of Cytology, Embryology and Histology Azerbaijan Medical University

"CONFIRM" Head of the Department of Histology, Cytology and Embryology Gasimov E.K.

Signature _____

12.09.2020

FACULTY: **070104** Dentistry

SUBJECT CODE: İPF- B05

SUBJECT TYPE: Mandatory

SEMESTER OF LEARNING THE SUBJECT: S1

SUBJECT CREDIT: 7 credits

FORM OF LEARNING THE SUBJECT: Full-time

LEARNING LANGUAGE: Azerbaijani, Russian, English

ОБУЧАЮЩИЕ ПРЕДМЕТУ Teaching staff of the department

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PREREQUISITES: No subject to be studied before studying the subject

CORREQUESITES: Teaching the subject "Human Anatomy" must be carried out in parallel with the teaching of this subject.

POST-REQUISITES: Students who have not completed a semester in cytology, embryology and histology should not be allowed to study pathological anatomy.

As a result of studying the subject, students will learn about the types of human cells and tissues, the morphological foundations of organs and general structural plans, their microscopic and ultrastructural features, learn to analyze histological images and electronograms, characteristics of the stages of development of organs and systems in the prenatal and postnatal periods, as well as mechanisms the formation of the organs of the head and neck, in particular the formation in the embryonic period, cyto-histogenesis, the occurrence of random variations and anomalies of the teeth.

The result of training in the subject

1. Know the general principles of the formation of living matter, general and distinctive features of prokaryotic and eukaryotic cells, classification, structural features and functions of organelles.

2. They can analyze microscopic images and electrograms displayed with the help of modern technical means.

3. Know the important stages of the formation of organs and systems in the prenatal (pre-embryonic, embryonic and fetal) and postnatal periods of individual development.

4. Explaining the general patterns of interaction between different types of tissues involved in the classification of tissues and the organization of organs.

5. Can describe the systems involved in the organization of the body using microscopic methods.

6. Know the main, variations and abnormalities of the structures surrounding the primary oral cavity stages, and their participation in the formation of organs located on the face and neck.

7. Know the histogenesis of temporary and permanent teeth, light and electron-microscopic structural features of their hard and soft structures, the mechanism of tooth replacement, the causes of variations and anomalies.

PLAN OF LECTURES
CYTOLOGY, EMBRYOLOGY, HISTOLOGY
(I course, II semester)

№	Topics	hours
1	Cytology as biological and medical science. The cell theory: basic stages of formation, the modern formulation, importance for biology and medicine. Plasma membrane: structure, functions. Cortical cytoplasm and cytoskeleton elements. Mechanisms of cellular movement. Sentrosome. Mitochondrion.	2

2	Endoplasmic reticulum. Golgi complex. Endosomes. Lysosomes and lysosomal storage diseases. Nucleus. Structure of the chromatin. General information about the nuclear and mitochondrial genome and gene expression. Cell cycle and type of cell division. Cell aging and death. Bases of cell pathology	2
3	Embryology as part of biological development. Progenesis, human sexual cells. Comparative analysis of spermatogenesis and ovogenesis. Human gametes. Fertilization. Zygote. Morulation. Blastocyst formation in human. Implantation. Gastrulation. Axial organs of embryo. The differentiation of germ layers and axial organs of embryo. Human embryo in 2 -8 weeks. Conception about the critical periods and teratogenic factors.	2
4	Histology as biological and medical science. Tissues – definition, classification. Epithelial tissues: histogenesis, classification, morpho-functional features. Covering epithelium. Glandular epithelium. The mechanism and periods of secretion. The mechanism of production of saliva.	2
5	Mesenchyme, its differentiation. Structural characteristics of cellular and none-cellular elements of connective tissue. Classification and histogenesis of connective tissue. Connective tissue proper. Specialized connective tissues. Blood. Embryonic and postembryonic hemopoiesis. Bone as an organ. Types and main stages of osteohistogenesis.	2
6	Contractile cells and tissues: classification. Neuro-muscular tissue. Smooth muscle tissue: histogenesis, innervation, vascularization. Striated muscle tissue: genesis, morpho-functional features, innervation and vascularization. Cardiac muscle tissue. Growth and regeneration of muscle tissues.	2
7	Nervous tissue: histogenesis, morpho-functional features. Neurons. Glial cells. Nerve fibers. Peculiarities of formation and conduction of nerve impulses. Modern views on nervous tissue. Nervous system: development, general morpho-functional features. Spinal cord. Brain stem. Cerebellum. Cerebral hemispheres. Module organization of cerebral cortex. Autonomic nervous system. The blood-brain barrier.	2
8	The general plan of the structure of the sensory organs. The concept of analyzers. Structural features of specialized receptor cells that receive various stimuli.	2
9	The endocrine system. Morphological foundations of neurohumoral regulation.	2
10	Differentiation of the divisions (anterior, middle and posterior) of the primary (primitive) intestine in the embryonic period. Morphofunctional characteristics of the general plan of the structure of tubular organs and glands of the digestive system. Large salivary glands.	2
11	Features of the structure, blood supply, innervation of organs involved in the acts of chewing and swallowing (lips, cheeks, tongue, hard and soft palate, pharynx). The main stages of the formation of teeth in the pre- and postnatal periods. Features of the development and mineralization of hard tissues of teeth (enamel, dentin, cement). Mechanisms of eruption of deciduous teeth and their replacement with permanent teeth. Sources of the development of the soft tissues of the tooth (gum, alveolar periosteum, periodontium, tooth pulp), structural features, role in the nutrition of the hard tissues of the tooth.	2
12	Histophysiological features of the tubular and glandular organs of the digestive system.	2
13	Cardiovascular system: development, general structural and functional plan. The relationship between hemodynamic conditions and the structure of the vessel wall Hematopoietic organs. Immunity, types, histological bases of immune defense reactions.	2

14	The integument system: development, components, functions. Respiratory system: development, components, structural and functional characteristics.	2
15	Genitourinary system: development, general plan of structure, functions, hormonal regulation. Hemato -urinal, hemato – follicular and hemato-testicular barriers.	2

PROGRAM OF PRACTICAL LESSONS

CYTOLOGY, EMBRYOLOGY, HISTOLOGY
(I course, II semester)

№	TOPICS	hour
1.	Histologic techniques. Methods of investigation. The general morphology of eukaryotic cells. The chemical content and ultrastructure of the plasma membrane	2
2.	Endocytosis. Exocytosis. Receptor function of the plasma membrane. Centrosome. Mitochondria.	2
3.	Ribosome. Endoplasmic reticulum. Golgi complex. Endosomes. Lysosomes. Proteasomes. Peroxisomes. Cytoplasmic deposits.	2
4.	Nucleus. Nuclear envelope. Nucleoplasm. Chromatin. Nucleolus	2
5.	Cell cycle. Mitosis.	2
6.	Progenesis. The structure of gametes. Meiosis. Fertilization. Implantation. Cleavage.	2
7.	Blastulation. Gastrulation. Differentiation of embryonic axial organs. Extraembryonic organs.	2
8.	Simple epithelium. Stratified epithelium. Glandular epithelium.	2
9.	Mesenchyme. Mesenchyma derivatives. Blood. Loose (areolar) connective tissue .	2
10.	Dense connective tissue. Connective tissues with special properties.	2
11.	Cartilage tissue. Chondrogenesis. Bone tissue.Osteohistogenesis.	2
12.	Muscle tissue	2
13.	Nervous tissue. Neurons. Glial cells. Nerve fibers.	2
14.	*Midterm exam*	2
15.	Spinal cord. Spinal ganglion. Cerebellum. Cerebral hemispheres	2
16.	Organ of vision. Olfactory organ.	2
17.	Organs of hearing and equilibrium. Taste organ	2
18.	Endocrine system	2
19.	Arteries. Microcirculation. Veins. Heart.	2
20.	Hemopoesis. Bone marrow. Thymus. Lymph node. Spleen	2
21.	Skin. Skin appendages. Trachea. Lungs.	2
22.	Lips. Tongue. Salivary glands.	2
23.	Structure and development of hard tissues of tooth.	2
24.	Structure and development of soft tissues of tooth.	2
25.	Esophagus. Stomach. Small and large intestines. Appendix.	2
26.	Liver. Pancreas	2
27.	Kidneys. Ureters. Urinary bladder	2
28.	Testes. Epididymis. Seminiferous tubules. Prostate gland	2
29.	Ovaries. Ovogenesis. Uterus. Fallopian tubes. Mammary gland. Placenta	2
30.	*Quiz*	2

EVALUATION:

It is possible to collect the necessary 100 points for obtaining a loan in this subject as follows:

50 points - before the exam

Including:

10 points - for attendance

10 points - for references

20 points - for intermediate assessment

10 points-gained in the classroom seminars.

Quizes will be held twice a semester. If you do not participate in the colloquium, 0 (zero) points will be recorded in the journal.

50 points - will be collected on the exam

The exam will be conducted by test method. The test will consist of 50 questions. Each question is one point. For incorrectly answered questions, points are removed from correctly answered questions.

THE NOTE:

If the exam does not score at least 17 points, the points earned prior to the exam will not be awarded. The points earned during and before the exam are added up and the final total is estimated as follows:

A-“excellent”	-91-100
B-“very good”	-81-90
C-“good”	-71-80
D-“satisfactory”	-61-70
E-“acceptable”	-51-60
F-“ unsatisfactory”	- less than 51

REFERENCES:

During the semester, 2 referencesare given. The performance of each is estimated with 5 points.

SILLABUS - WORKING EDUCATIONAL PROGRAM

The content of the bachelor's degree covers the planning of the educational process, the forms and methods of its implementation, the volume of the study load, the duration of educational stages (semesters), types of training (lectures, classes, laboratories, etc.), requirements for educational programs.

The planning and organization of the educational process (exemplary workers and individual) are implemented on the basis of work programs in the subjects. The form and structure of these documents are determined by the university.

Subject programs are developed by higher educational institutions in accordance with the requirements of higher education programs in specialties and are approved by the Ministry of Education of the Republic of Azerbaijan. Work programs (syllables) are developed on the basis of subject programs and are approved by higher educational institutions.

Working plan (syllabus) - a description of the subject, its purpose and objectives, a summary, duration and types of lessons, assignments for the student's independent work, their duration, consultation hours, information about the teacher, prepared on the basis of the corresponding curriculum of the subject; this is a document containing the teacher's requirements, assessment criteria, an intermediate grading schedule, a list of references.

LITERATURE AND MATERIALS:

http://www.amu.edu.az/az/cafedra/1119/3208 General histology - the text of the lecture. Compiled by: Gasimov EK and Sultanova T.A.

1. Abdullayev M.S., Abiyev H.S. Histoloji nomenklatura: Ali məktəblər üçün dərs vəsaiti. Bakı: Az. Döv. Tibb İnst., 1972, 181 s.
2. Abdullayev M.S., Abiyev H.S. Ümumi histologiya : Ali məktəblər üçün dərslik. Bakı: Maarif, 1975, 323 s.
3. Qasımov E.K. Sitologiya: Ali məktəblər üçün dərslik. Bakı: "Time Print", 2013, 272 s.
4. E.K.Qasımov. Histologiya atlası. Bakı: Oskar, 2010, 510s.
5. Xüsusi histologiya. E.K. Qasımovun redaktəsi ilə. Bakı, 2015, 310s.
6. Алмазов И.В., Сутулов Л.С. Атлас по гистологии и эмбриологии. М.: Медицина, 1978, 543 с.
7. Гистология: (введение в патологию). Учебник для студентов / Под ред. Э.Г.Улумбекова, Ю.А.Челышева. М.: ГЭОТАР-МЕД, 1998, 960 с.
8. Гистология: (введение в патологию). Учебник для студентов / Под ред. Э.Г.Улумбекова, Ю.А.Челышева. М.: ГЭОТАР-МЕД, 2005, 672с.
9. Кузнецов С.Л., Мушкамбаров Н.Н. Гистология, цитология и эмбриология. Учебник для студентов медицинских вузов. М.: ООО "Медицинское информационное агенство", 2012, 600 с.
10. Хэм А., Кормак Д. Гистология (в пяти томах). Перевод с английского / Под ред. Ю.И.Афанасьева, Ю.С.Ченцова. М.: Мир, 1983, 1362 с.
11. Ю.И.Афанасьев, Н.А.Юрина. Гистология. М., 2006, 766 с.
12. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular Biology of the Cell. 5th ed. New York: Garland Publishing; 2008, 1601 p.

13. Gartner LP, Hiatt JL. Color textbook of histology. 4th international ed. Philadelphia: PA:, Elsevier, 2017, 657 p.
14. Gray`s anatomy. 38th ed. / Chairman of the editorial board Peter L. Williams. New York:Churchill Livingstone Inc., 1995, 2092 p.
15. Junqueira LC, Carneiro J. Basic histology. New York: McGraw Hill Companies, 2013, 515 p.
16. Kerr JB. Atlas of functional histology. London: Mosby, 1999, 402 p.
17. Ross MH, Pawlina W. Histology. A text and atlas with correlated cell and molecular biology. 7th ed. Baltimore: Lippincott Williams & Wilkins, 2016, 984 p.
18. Sadler TW. Langman's Medical Embryology. 13th edition. Philadelphia: Lippincott Williams &Wilkins, 2015, 407 p.
19. Terminologia Histologica. International terms for human Cytology and Histology. Philadelphia: Lippincott Williams & Wilkins, 2008, 207 p.
20. Wheater`s functional histology. 4th ed. / Edit. Young B and Heath JW. Edinburgh: Churchill Livingstone, 2000, 413 p.

CUORSEWORK

Coursework on this subject is not provided.

PRACTICE

Industrial practice on this subject is not provided.

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