


<p> ОҢТҮСТІК ҚАЗАҚСТАН MEDISINA AKADEMIASY «Оңтүстік Қазақстан медицина академиясы» АҚ </p>		<p>  SOUTH KAZAKHSTAN MEDICAL ACADEMY АО «Южно-Казахстанская медицинская академия» </p>
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LECTURE COMPLEX

Discipline: "Normal blood and lymph"

Discipline code: NBL 2210


Name and code of the EP: 6B10115 "Medicine"

Amount of study hours/credits: 15/0.5

Course and semester of study: 2/3


Lecture length: 1 hour


Shymkent, 2024

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The lecture complex was developed in accordance with the working curriculum of the discipline (syllabus) "Normal blood and lymph" and discussed at a meeting of the department of «Topographic anatomy and histology»

Protocol No. 1 from "03" 09 2024

Head of the department, c.m.s., acting professor  Murzanova D.A.

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Lecture No. 1

1. The theme: Blood and lymph.

2. Purpose:

1. to give an idea of the patterns of development of the structure of the shaped elements of the blood.
2. Explanation of the features of embryonic hematopoiesis and postembryonic hematopoiesis. Formation of ideas about postembronal immunopoiesis.

3. The thesis of the lecture.

General characteristics of the internal environment of the tissue. Blood and lymph. The source of development. Blood consists of shaped plasma elements and cells of intercellular substance. The ratio of blood plasma and shaped elements. Blood function: transport, protective, homeostatic. The structure of the blood. Plasma. Plasma is the composition of plasma. Shaped blood elements: erythrocytes, leukocytes, platelets. Erythrocytes are nuclear-free erythrocytes, a post-cellular structure. The form of erythrocytes, discocytes, echinocytes, sickle-shaped erythrocytes, teardrop-shaped erythrocytes, stomatocytes, planocytes, etc. Normocytes, microcytes, macrocytes. Isocytosis. Poikilocytosis. Erythrocytosis, anemia. Electron microscopic structure of erythrocytes. Chemical structure. Hemoglobin. The activity of red blood cells. Reticulocytes. Leukocytes are granular (granulocytes) and cell-free (agranulocytes). Granulocytes granulocytes: neutrophils, eosinophils, basophils, their structure and functional significance. Cell-free leukocytes: small, medium, and large lymphocytes and monocytes, their structure and functional significance. The mononuclear system of phagocytes. Platelets (blood plates). Origin. Granulomer and hyalomer. A variety of platelets: young, mature, old, degenerative, giant. The number of platelets in the blood. Lymph. The mechanism of lymphatic formation. The lymphatic structure. The main function of lymph.

The development of blood as tissue (embryonic hematopoiesis). Post-embionic hematopoiesis and immunopoiesis - physiological restoration of blood. The unitary theory of hematopoiesis according to A. A. Maksimova and its modern interpretations. Characteristics of stem and partial blood stem cells (polypotent precursors), unipotent precursors. The circulation of mast cells in the body. The concept of units of colonial formation of blood cells (KTB). Characteristics of blast forms of blood cells. Morphologically identifying stages of blood cell development are differentiated (ancient) cells and differentiated (mature) cells. Microscopic, ultramicroscopic and cytochemical characteristics of erythrocytes, granulocytes, monocytes, T-lymphocytes, b-lymphocytes and blood platelets. Characteristics of myeloid and lymphoid tissues and the role of the microenvironment in the development of hematopoietic cells. Regulation of hematopoiesis and immunopoiesis.

Blood is a liquid tissue that circulates through blood vessels. It consists of 2 main components-shaped elements and plasma. Plasma is 55-60%, molded elements are 40-45%. The human body has an average of 5-5.5 liters of blood.


2. characteristics of blood plasma.

Blood plasma consists of 90-93% water, 7-10% dry residue (proteins-albumins, globulins, fibrinogen; mineral salts, glucose, trace elements).

3. The unitary theory of hematopoiesis. Classes of developing blood cells.

The founder of the modern unitary theory of hematopoiesis is the Russian histologist Maximov. In 1907, Maximov claimed that all blood cells develop from a single source cell; moreover, he morphologically named this cell a small lymphocyte. Classes of cells:

Class 1-polypotent hematopoietic stem cells (PSCs). Morphologically it resembles small black lymphocytes. At rest, it is undifferentiated, polypotent, can divide into any blood cell and provide for itself.

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Class 2-partial stem cells (PSC) - myelopoiesis progenitor cells, lymphopoiesis progenitor cells. The mutual transfer of these cells is also possible when a specific microenvironment changes. Morphologically it resembles small black lymphocytes.

Class 3 are separate precursors, there is a separate precursor for each blood element. A mutual transition between the directions of differentiation will be impossible. Morphologically it resembles small black lymphocytes.

Class 4-explosive cells differentiated in a strictly defined direction are morphologically distinguishable.

Grade 5-maturity cells. Structures characteristic of each cell are formed in the cells, and the cells gradually lose their ability to divide.

Class 6-mature blood cells.

4. Illustrative material

- * micrography of color histopreparations
- * electronic messages
- * diagrams, drawings

5. Literature:

Main literature

1. Inderbir Singh. Textbook of Human Histology. With Color Atlas and Practical Guide/8 th Edition. Jaypee Brothers Medical Publishers .2016.-302 p. Перевод Гистология человека
2. Dudek Ronald W. Embryology / Ronald W. Dudek. - 5th ed. - [s. l.] : Wolters Kluwer, 2014. - 158 p. Перевод заглавия: Эмбриология
3. Gartner Leslie P. Cell Biology and Histology / Leslie P. Gartner. - 8th ed. - [s. l.] : Wolters Kluwer, 2019. - 436 p. - (BRS. Board Review Series) Перевод заглавия: Клеточная биология и гистология

Additional literature


Textbook of Human Histology. Inderbir Singh /Sixth Edition/Inderbir Singh 2010.-386 p.
Перевод Учебник по гистологии человека

Electronic publications

1. ATLAS OF HISTOLOGY with Functional Correlations. Thirteenth Edition, Wolters Kluwer. 2017.- 1102 p.
2. Theory and practice of Histological techniques. Eighth edition. Elsevier Limited. 2019.-554 p.
3. Textbook of Human Histology. With Color Atlas and Practical Guide/8 th Edition. Jaypee Brothers Medical Publishers .2011.-386 p.
4. USMLE Step 1. Lecture Notes 2018. by Kaplan. 2018.-425 p/
5. Zhumabayeva, S.E., Boken, T.S. Cytology and histology : Educational-methodical complex. . - Kokshetau: KGU, 2017. - 101 p. <http://rmebrk.kz/>
6. Бородулина, О.В. Цитология и гистология – Cytology and histology : Практикум. / Костанайский гос. педагогический университет им. У. Султангазина. - Костанай: КГПУ им. У. Султангазина, 2020. - 100 с. - <http://rmebrk.kz/>

6. Security questions: (feed back).

1. * Morphofunctional characteristics.
2. * Blood plasma
3. * The structure and functions of red blood cells
4. * Structure and function of leukocytes
5. * Platelet structure and function
6. * Leukocyte formula
7. * Lymphatic composition
8. * The main sources and stages of the formation of hematopoiesis and immune defense organs.

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9. * Features of postembryonic hematopoiesis
10. * Postembryonic immunopoiesis.
11. * Morphological bases of immunological reactions.