

Ministry of Health of the Republic of Belarus
Education Establishment
"Gomel State Medical University"
Normal Physiology Department

It was discussed at the department meeting 30.08.16
The protocol № 8

METHODICAL INSTRUCTION

for carrying out classes by teachers with the 2nd course students
of Faculty for training specialists for foreign countries (teaching in English)
on normal physiology

Topic: Erythrocytes sedimentation rate. Blood groups.
Regulation of haemopoiesis system

General time of the class 4 hours.

**1. THE STUDYING AND EDUCATIONAL PURPOSES, THE MOTIVATION FOR
ASSIMILATION OF THE SUBJECT, REQUIREMENTS TO THE INITIAL LEVEL OF
KNOWLEDGE**

Purpose of the class

Students have to acquire concepts of osmotic resistance of erythrocytes, what factors define group accessory of blood, what influence on ESR parameter, and also value of Rhesus factor definition.

Motivational characteristic of the subject

The general clinical blood test is one of the most widespread laboratory researches. Therefore the medical student needs to know standards and physiological value of parameters of the general blood test including osmotic resistance of erythrocytes. Also students need to know a technique of definition of a blood groups, Rh factor, ESR, physiological value of these parameters and to have an idea of possible sources of mistakes when determining blood groups and Rh factor.

Tasks of the class

In the course of the class students have to study different types of hemolysis, master a technique and be able to define groups, Rhesus factor, ESR.

As a result of carrying out the class the student has to:

To know:

- the factors defining group accessory of blood;
- ESR diagnostic value;
- diagnostic value of osmotic resistance of erythrocytes;
- the basic concepts and terms on the class subject;
- basic physiological constants on the class subject.

To be able:

To define osmotic resistance of erythrocytes, blood groups, Rhesus factor, ESR.

2. CONTROL QUESTIONS FROM RELATED SUBJECTS:

1. Biochemical composition of blood plasma.

3. CONTROL QUESTIONS ON THE CLASS SUBJECT:

1. Hemolysis, its types. Osmotic resistance of erythrocytes, its size and diagnostic value

2. The erythrocytes sedimentation rate, factors influencing its size and diagnostic value.
3. Blood groups. ABO system. The factors defining group accessory of a blood. Determination of compatibility of blood. Types of hemotransfusions.
4. Rh factor. Essence of anti-D - prophylaxes. Basic principles of hemotransfusion.
5. Blood-substituting solutions and the main demands to their preparation. Saline solutions, colloid solutions, blood preparations, their positive and negative properties.
6. Regulation of blood system. Nervous and humoral mechanisms of hematopoiesis regulation.
7. Age changes in blood system.

Questions for independent studying:

1. An iron metabolism in an organism.
2. Group-specific properties of blood.

Report:

1. Allergy. Mechanism of development of allergic reactions. Allergens.
2. Group-specific properties of a blood.
3. Blood-substituting solutions.

4. PRACTICAL PART OF THE CLASS

Laboratory work 4.1 Examination of various kinds of hemolysis

Laboratory work 4.2 Examination of osmotic resistance of erythrocytes

Laboratory work 4.3 Definition of erythrocyte sedimentation rate (ESR) by T.P. Panchenkov

Laboratory work 4.4 Blood grouping

Laboratory work 4.5 Definition of rhesus-factor (Rh) of blood

5. THE COURSE OF THE CLASS

- *Introduction*: the teacher answers questions of students which caused certain difficulties in the course of independent mastering of education material;

- *Requirements to the initial level of knowledge*: From biochemistry and histology students should know the morpho-functional characteristic of erythrocytes, composition of blood plasma;

- *Correction of the initial level of knowledge*: The teacher checks and adds the initial level of knowledge of students on theoretical and application-oriented questions on the subject of the class "Erythrocytes sedimentation rate. Blood groups. Regulation of hematopoiesis system ". In this section questions of the speed of erythrocytes sedimentation rate, blood groups, Rhesus factor, the blood-substituting solutions, regulation of blood system are considered. The teacher corrects the answers of students on the considered subject;

- *Setting of problems which will be solved by students*: - The teacher sets the task to study different types of hemolysis, to master a technique of erythrocytes osmotic resistance determination, to master techniques of definition of blood groups, Rhesus factor, ESR;

- *Independent performing of tasks by students*:

-students perform practical work under monitoring of the teacher and laboratory assistant,

-students make out the protocol of laboratory work with the subsequent discussion of its performance techniques:

- *Assessment of final level of knowledge of the class subject*: - The teacher specifies the final level of knowledge of students on theoretical and practical questions, the basic concepts and terms, and also knowledge of basic physiological constants of the class subject;

- *Viewing of the video movie*

- *Fixing of knowledge*: The teacher suggests students to solve several situation-dependent problems on the class subject, to pass computer test on the class subject;

- *The conclusion of the teacher and the task to the next class*: At the end of the class the teacher makes the conclusion about the carried-out work and tells students the home task for the

independent work. Then summing up the results of the class and signing of experience protocols is made.

Note: time of breaks is 15 minutes during a class.

6. QUESTIONS FOR SELF-CHECKING OF KNOWLEDGE

1. What is the minimum osmotic resistance of erythrocytes (concentration of NaCl solution in %)?
2. The Rhesus factor-negative woman has Rhesus factor-positive fetus, pregnancy is the second. The first child was born normal. Whether there is a threat of Rhesus factor conflict at the real repeated pregnancy?
3. To what group does blood belong if agglutination happened in all drops of standard serums where the examined blood was added?
4. To what group does blood belong if there is no agglutination in all drops of standard serums where the examined blood was added?

LITERATURE

Basic

1. Human physiology: textbook for overseas students = Физиология человека: учеб. пособие для иностранных студентов, обучающихся на английском языке / А. И. Киеня [и др.]; под ред. проф. Э. С. Питкевича; пер. на англ. яз. Р. А. Карпов, В. А. Мельник. — Гомель: УО ГогМУ, 2009. — 352 с.
2. Сборник нормативных документов по проблеме ВИЧ/СПИД. Минск, 1999. 132 с. Приказ № 351 от 16.12.1998г. Приложение № 8 «Инструкция о профилактике внутрибольничного заражения ВИЧ-инфекцией и предупреждению профессионального заражения мед. работников». С. 31-35.
3. Text of lectures.

Alternate

1. Textbook of medical physiology // C. Guyton, 2006. — 1116 p.
2. Human anatomy and physiology // Alexander P., Spence-Elliott B. Masson.
3. Human physiology. The mechanisms of body function // Arthur J. Vander James H Sherman Dorothy S. Luciano, 1986. — 715 p.
4. Lecture notes on human physiology // John J Bray, Patricia A. Cragg, Anthony D.C. Macknight, Roland G. Mills and Douglass W. Taylor.
5. Human anatomy and physiology // Elaine N. Marieb, 1989. — 995 p.
6. Review of medical Physiology, International edition, 2003. — 912 p.