

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: Systemic pain mechanisms

The 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**

Purposes of the class

Students have to study a structure and functions of olfactory and gustatory analyzers. To receive the main ideas of nociceptive and antinociceptive systems.

Motivational characteristic of the subject

The continuous communication of an organism with the external environment providing its adaptation to external influences is carried out by means of analyzers. Knowledge of the general principles of structure and functions of analyzers, and also knowledge of methods of research of sensory systems are necessary for the medical student for the purpose of the qualified comprehension of information value of various indicators providing adaptive and compensatory reactions.

Tasks of the class

To learn to determine tactile sensitivity by an esthesiometry method, to study the technique of research of color vision by means of polychromatic tables of E. B. Rabkin.

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

To know:

- structure and functions of the olfactory analyzer;
- structure and functions of the acoustic analyzer;
- structure and neurochemical mechanisms of nociceptive and antinociceptive systems;
- the conducting ways of analyzers;
- principles of anesthesia;
- the basic concepts and terms on the class subject;

To be able:

To determine tactile sensitivity by esthesiometry method, to conduct research of color vision by means of polychromatic tables of E. B. Rabkin.

2. CONTROL QUESTIONS FROM RELATED SUBJECTS:

1. Anatomic and general morphofunctional characteristic of olfactory and gustatory analyzers.

2. Classification, structure and cytophysiology of neurosensory and sensor-epithelial receptor cells.

3. CONTROL QUESTIONS ON THE CLASS SUBJECT:

1. Olfactory system.

1.1. Structurally functional organization of the olfactory analyzer. Receptor department and mechanism of reception of odorous substances. Conduction and central departments.

1.2. Perception and classification of smells. Feeling of smells at the person. The factors influencing a perception of olfactory feelings. Adaptation.

2. Gustatory analyzer.

2.1. Oral cavity receptors. Main gustatory feelings of the person, mechanisms of a gustatory perception. The factors influencing a taste perception.

2.2. Conduction and central parts of the gustatory analyzer.

3. Systemic mechanisms of pain.

3.1. Biological value of pain. Causes of pain. Components of systemic pain reaction.

3.2. Classification of pain, their mechanisms. Projective and referred pain.

3.3. Nociceptors. Neurochemical mechanisms of sensation of pain. Conduction and central departments of nociception.

3.4. Antinociceptive system – levels of its organization. Neurochemical mechanism of antinociceptive system.

3.5. Anesthesia methods – physiotherapeutic, pharmacological and neurosurgical. Nontraditional methods of anesthesia.

Questions for independent studying

1. Interaction of analyzers.

2. Acupuncture.

4. PRACTICAL PART OF THE CLASS

32.1. Contrast phenomenon in the visual analyzer

32.2. Definition of color vision

32.3. Examination of tactile sensitivity. Esthesiometry

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.

- *Demands to the initial level of knowledge:* from sections of anatomy, histology and biochemistry students have to know the morphofunctional characteristic of olfactory and gustatory analyzers. By preparation of control questions students have to give in workbooks the main definitions on the subject.

- *Check and correction of initial level of knowledge:* the teacher checks and supplements the initial level of knowledge of students of theoretical and applied questions on the class subject. In this section the structurally functional organization of the olfactory and gustatory analyzer, systemic mechanisms of pain, levels of the organization and neurochemical mechanisms of antinociceptive system, the principles of anesthesia are considered

- *Statement of problems which will be solved by students:* The teacher sets a task to study techniques of definition of color vision according to Rabkin's tables and research of tactile sensitivity by esthesiometry method.

- *Independent performance of tasks by students:*

- students make out the protocol of the class with the subsequent discussion of a technique of performance;

- students perform practical work under control of the teacher or laboratory assistant.

- *Assessment of final level of knowledge of the class subject:* The teacher specifies the final level of knowledge of students of theoretical and practical questions, the basic concepts and terms.

- *Fixing of knowledge:* The teacher suggests students to solve several situational problems of the subject of the class and to answer test questions,

- *The conclusion of the teacher and a task to the next class:* At the end of the class the teacher does the conclusion about the carried-out work and offers students home task for independent work. Then summing up the class and signing of protocols of experience is carried out.

Note: time of breaks of 15 minutes during the class.

6. QUESTIONS FOR SELF-CHECKING OF KNOWLEDGE

1. At the person olfactory hallucinations are observed. With dysfunction of what structure of CNS can these changes of smell perception be bound?

2. At the person the tongue end is damaged. What type of gustatory feelings will be mainly broken?

3. At the patient absence of pain and thermal sensitivity on the right side of a trunk and paralysis on left is observed. In what department of CNS is the damage?

4. The patient complains of the burning, badly localized pains arising spontaneous, or at action of usual and not really strong stimuli, for example, at an arm skin stroking. At damage of what structure of brain can this symptom be observed?

5. Explain the mechanism of emergence of projected and referred pain.

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 ГoГМУ, 2009. — 352 с.

2. 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.