

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: Endocrine system, physiological role and regulation of formation of hormones.

The general time of the class – 4 hours

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

Purposes of the class

To form at students idea of functions of endocrine glands, classification and properties of hormones, mechanisms of action and physiological role of hormones of hypophysis, thyroid gland, parathyroid glands, pancreas.

Motivational characteristic of the topic

Endocrine glands excrete hormones which are the most important factors of humoral regulation, influence metabolism, regulate processes of the differentiation, body height, intensity of functional activity of working organs and tissues. Human height is an integrated indicator of influence of genetic, hormonal, tissue and external factors on the bones and other tissues of an organism. The simplest and available method of examination of somatotrophic function is anthropometric, namely, human height assessment in comparison with the prognosticated body height calculated on the basis of the average height of his parents. The medical student has to learn the method of calculation of the prognosticated human height.

Tasks of the class

To study classification, properties, mechanisms of action and physiological role of hormones. At performing laboratory work students have to acquaint with a method of calculation of the prognosticated human height, a questionnaire method of identification of persons with high risk of the diabetes.

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

To know:

- structure and functions of endocrine glands, classification and properties of hormones;
- methods of studying of endocrine system;
- mechanisms of action and physiological role of hormones of hypophysis, thyroid gland, parathyroid glands, pancreas.
- the basic concepts and terms on the topic of class.

To be able:

- to calculate the prognosticated human height;
- to estimate the risk of diabetes mellitus by a questionnaire method.

2. CONTROL QUESTIONS FROM RELATED SUBJECTS:

1. Structure of endocrine system.
2. Hormones, their chemical nature and mechanisms of biological effect.

3. CONTROL QUESTIONS ON THE TOPIC OF THE CLASS:

1. A concept about endocrine glands. General characteristic of endocrine glands, their functions. Interaction of nervous and humoral mechanisms of the regulation of functions at the hypothalamic level.
2. Hormones, their chemical nature, classification and properties. Mechanisms of the reception of hormones and their action on cells targets. Daily frequency. The principles of interrelations in endocrine system.
3. Hormones of anterior lobe of the hypophysis and their physiological role. Regulation of function of adenohypophysis. Role of hypothalamic factors. Effects of hypo - and hyperproduction of separate hormones of adenohypophysis.
4. Hormones of medium and posterior lobe of hypophysis, their physiological role. A hypothalamus role in a regulation of function of neurohypophysis.
5. Thyroid gland, its structural organization. The iodated hormones (T3 and T4), their biosynthesis, transport by blood, physiological role. Influence of hormones of thyroid gland on processes of body height and development of CNS. Participation of thyroid hormones in adaptation processes. Regulation of secretion of hormones.
6. Hyper- and hypothyroid states. Cretinism, myxedema. Basedov disease. Physiological hyperfunction of thyroid gland. Endemic goiter and its prevention.
7. Contours of neurohumoral regulation of function of a thyroid gland. Methods of diagnostic of thyroid gland functional state.
8. Endocrine function of pancreas. A role of hormones of pancreas in regulation of carbohydrate, fat and protein metabolism. Regulation of the secretion of hormones. A concept about hypo - and hyperglycemia states and their reasons.

Questions for independent studying

1. Hormonal status of the newborn.
2. A concept about prostaglandins, their value.
3. Age changes in endocrine system.

4. PRACTICAL PART OF THE CLASS

Laboratory work 12.1. Evaluation of human height

Laboratory work 12.2. The questionnaire method of identification of persons with high risk of diabetes mellitus.

5. THE COURSE OF THE CLASS

- *Introduction*: the teacher answers questions of students which caused certain difficulties in the course of mastering of a training material.

- *Requirement to the initial level of knowledge*: from sections of anatomy, histology and biochemistry students have to know the morphofunctional characteristic of endocrine system. By preparation of control questions students have to give in workbooks the main definitions on the topic.

- *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 topic "Endocrine system, physiological role and regulation of formation of hormones". At this section functions of endocrine glands, classification, properties, mechanisms of action and the physiological role of hormones are considered. The teacher corrects answers of students on the considered topic.

- *Statement of problems which will be solved by students*: The teacher sets the task to study a method of calculation of the prognosticated human height, the questionnaire method of persons identification with high risk of diabetes mellitus.

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

- *Viewing of the video "Endocrine System"*.

- *Fixing of knowledge*: The teacher suggests students to solve several situational problems of the topic of the class, to pass computer test.

- *The conclusion of the teacher and a task for 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 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. Call the main groups of the substances participating in a humoral regulation of functions of an organism?

2. What glands are named endocrine? List them?

3. Tachycardia, an exophthalm, rising of level of the main metabolism up 40% is found in the patient at examination. Of what endocrine gland function disorder is it possible to think?

4. Ways of intercellular communication with participation of chemical signals?

5. What will happen to function of an endocrine gland if to intriduce high doses of its hormones into an organism?

6. List the main functions of growth hormone ?

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. Maried, 1989. — 995 p.

6. Review of medical Physiology, International edition, 2003. — 912 p.