EDUCATIONAL AND METHODICAL COMPLEX OF DISCIPLINE
MiF1202 «Morphology and human physiology»
Course – 1 Semester – 2
Number of credits – 11
Almaty 2022

Lecture 1 Introduction to anatomy and physiology and The Human Body Plan

Outcomes:

1. Define anatomy ,physiology relate them to each other.
2. Define *homeostasis,* explain its significance, and discuss how it is maintained by negative feedback;
3. Discuss positive feedback and its effects on the body;
4. Define or demonstrate the *anatomical position* and explain its importance in descriptive anatomy;
5. Define the three major anatomical planes of the body;
6. Identify the major anatomical regions of the body;
7. Describe the body's cavities and the membranes that line them;
8. Name the 11 organ systems, their principal organs, and their functions.

An understanding of anatomy and physiology is not only fundamental to any career in the health professions, but it can also benefit your own health. This lesson begins with an overview of anatomy and physiology and a preview of the body regions and functions. It then covers how the body works to maintain stable conditions. It introduces a set of standard terms for body structures and for planes and positions in the body that will serve as a foundation for more comprehensive information covered later in the text.

Human anatomy is the scientific study of the body's structures. Human physiology is the scientific study of the chemistry and physics of the structures of the body. Physiology explains how the structures of the body work together to maintain life. It is difficult to study structure (anatomy) without knowledge of function (physiology) and vice versa. The two disciplines are typically studied together because form and function are closely related in all living things.

Homeostasis is the activity of cells throughout the body to maintain the physiological state within a narrow range that is compatible with life. Homeostasis is regulated by negative feedback loops and, much less frequently, by positive feedback loops. Both have the same components of a stimulus, sensor, control center, and effector; however, negative feedback loops work to prevent an excessive response to the stimulus, whereas positive feedback loops intensify the response until an end point is reached.

Ancient Greek and Latin words are used to build anatomical terms. A standard reference position for mapping the body's structures is the normal anatomical position. Regions of the body are identified using terms such as "occipital" that are more precise than common words and phrases such as "the back of the head." Directional terms such as anterior and posterior are essential for accurately describing the relative locations of body structures. Images of the body's interior commonly align along one of three planes: the sagittal, frontal, or transverse

Knowledge of the external anatomy and landmarks of the body is important in performing a physical examination and many other clinical procedures. For purposes of study, the body is divided into two major regions called the axial and appendicular regions.

The body wall encloses multiple body cavities, each lined with a membrane and containing internal organs called viscera (singular, viscus). Some of these membranes are two-layered, having one layer against the organ surface (such as the heart or lung) and one layer against a surrounding structure (forming, for example, the inner lining of the rib cage); there is only a thin film of liquid between them. In such cases, the inner layer, against the organ, is called the visceral layer of the membrane, and the more superficial or outer one, the parietal layer.

The human body has 11 organ systems and an immune system, which is better described as a population of cells that inhabit multiple organs rather than as an organ system. The organ systems are classified in the following list by their principal functions, but this is an unavoidably flawed classification. Some organs belong to two or more systems— for example, the male urethra is part of both the urinary and reproductive systems; the pharynx is part of the respiratory and digestive systems; and the mammary glands can be considered part of the integumentary and female reproductive systems.

The organ systems are as follows: Systems of protection, support, and movement: Integumentary system, Skeletal system, Muscular system; Systems of internal communication and control: Nervous system, Endocrine system; Systems of fluid transport: Circulatory system, Lymphatic system; Systems of intake and output: Respiratory system, Urinary system, Digestive system; Systems of reproduction: Male reproductive system, Female reproductive system.

Review questions

1.Describe anatomical position and why it is important for anatomical description?

2.What regulatory processes would your body use if you were trapped by a blizzard in an unheated, uninsulated cabin in the woods?

3.Identify three planes most commonly used in the study of anatomy?

4.The female ovaries and the male testes are a part of which body system? Can these organs be members of more than one organ system? Why or why not?

Basic literature:

1. Saladin, Kenneth S: Essentials of Anatomy & Physiology. (2018, McGraw-Hill Education)
2. Costanzo, Linda S.: BRS Physiology. Board Review Series.7 edition. -Wolters Kluwer Health, 2018.- 307p. - ISBN 1496367693, 9781496367693

3. Leslie P. Gartner: Color Atlas and Text of Histology. - 7th Edition. - Wolters Kluwer, 2017. ISBN 1496346734, 9781496346735
4. Russell K. Hobbie, Bradley J. Roth: Intermediate Physics for Medicine and Biology. - Springer, 2015. - ISBN 3319126822, 9783319126821
5. Andersson D, Medical Terminology: The Best and Most Effective Way to Memorize, Pronounce and Understand Medical Terms: Second Edition, ISBN-13 : 978-1519066626, 2016