



Katedra i Zakład Fizjologii

Course Name: Human Physiology

Muscles

Teacher: Aleksandra Wojciechowicz MD

1. Prerequisites:

The student has knowledge from the e-learning seminar on muscles, with particular emphasis on:

- a. the structure of skeletal muscle (actin and myosin filaments, myofibrils, muscle fibers, the origin and insertion of the muscle, tendons, muscle belly).
- b. the sliding theory of contraction
- c. the sources of ATP in skeletal muscles and the process consuming high-energy phosphate bonds in muscles
- d. the basis of antagonism and cooperation of muscles in performing movements.
- e. the basic cytological, histological, and anatomical differences between smooth and striated muscle tissues.

Additionally:

- a. the human skeletal system, the connections between bones, and is able to provide examples.
- b. the interaction between the skeletal and muscular systems.
- c. the structure, anatomy, and functioning principles of joints.

2. Special Requirements:

A laboratory coat is not required. However, it is necessary to wear flat shoes that allow for simple physical activities. Comfortable clothing that does not restrict movement is also recommended, though sportswear is not mandatory.



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3. Scope of the Seminar:

- a. Motor function of muscle contraction
- b. Types of contractions – isometric and isotonic exercises
- c. Assessment of movement dynamics
- d. Assessment of strength and physiological parameters of contraction
- e. Stimulation of muscle tissue
- f. Assessment of muscle pathology
- g. Ultrasonography of muscle tissue
- h. Bioimpedance
- i. Assessment of gait and body movement in humans

4. Literature:

Dee Unglaub Silverthorn, *Human Physiology: An Integrated Approach*, PZWL, 2022 (primary literature).

5. Conditions for passing the topic:

To pass the topic, students are required to have knowledge from the basics (point 1), presented during theoretical classes, and the content covered in exercises (point 3). Additionally, students must be familiar with the content discussed during the classes.