MUNI MED Department of Histology and Embryology

Practice 12 Muscle tissue

1. Characterize and graphically schematize the structure of the muscle fiber (rhabdomyocyte).
2. Draw into the scheme of the muscle fiber: nuclei, sarcolemma, myofibrils, sarcomeres, t-tubules, sER, and mitochondria. Indicate where the triad is located.
3. Graphically schematize structure of the sarcomere as it appears in the TEM. Position into the scheme the following structures: A-band, I-band, Z-line, H-zone, M-line, actin and myosin myofilaments, and other proteins (α-actinin, titin, nebulin). Determine which parts of the sarcomere change their size during contraction.
4. Estimate the size of sarcomere (in μm) and the extent of contraction (in %).
5. Schematically describe the mechanism of muscle contraction. Position it into the scheme of the rhabdomyocyte and the sarcomere.
6. What is the mechanism of action of botulotoxin, curare and myasthenia gravis disorder?
7. How are the biomechanical forces transmitted to the surrounding connective tissue, tendons and ligaments? What is the role of protein dystrophin? What is the dystrophin-associated pathology?
8. How is the connective tissue arranged in muscles? Graphically schematize endomysium, perimysium and epimysium.
9. What are the principal differences between cardiac and skeletal muscle tissue? Is there any difference in structure of myofibrils and sarcomere?
10. What is the structure and function of intercalated discs?
11. Graphically schematize the structure of the leiomyocyte. How is the cytoskeleton in the leiomyocyte organized to perform contraction? How the contraction is regulated?
12. What is the embryonic origin of skeletal, cardiac and smooth muscle tissues?
13. Describe the “myoblast”, “myotube” and “(myo)satellite cells” and position them correctly into the muscle development scheme.

Recommended study materials: Presentations from practices and lectures, Atlas of Histology (online), Atlas of Cytology and Embryology (online), Junqueira's basic histology.