MUSCLES

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Myathenia gravis

- **Def.:** an auto-immune disease that affects the neuro-muscular junction & it is characterized by muscle weakness and rapid onset of fatigue.

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- **Incidence:** 1/ 20,000 usually female.

Myasthenia gravis

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Causes:

1- ↓ Number of acetyl choline vesicles in the axon terminal.

2- ↓ A. Ch content in the vesicles.

3- Widening of the synaptic cleft.

4- ↓ Number of junctional folds thus decreasing the surface area.

5 - ↓ Number of A.ch. receptors on postsynaptic membrane due to production of auto-antibodies against them.

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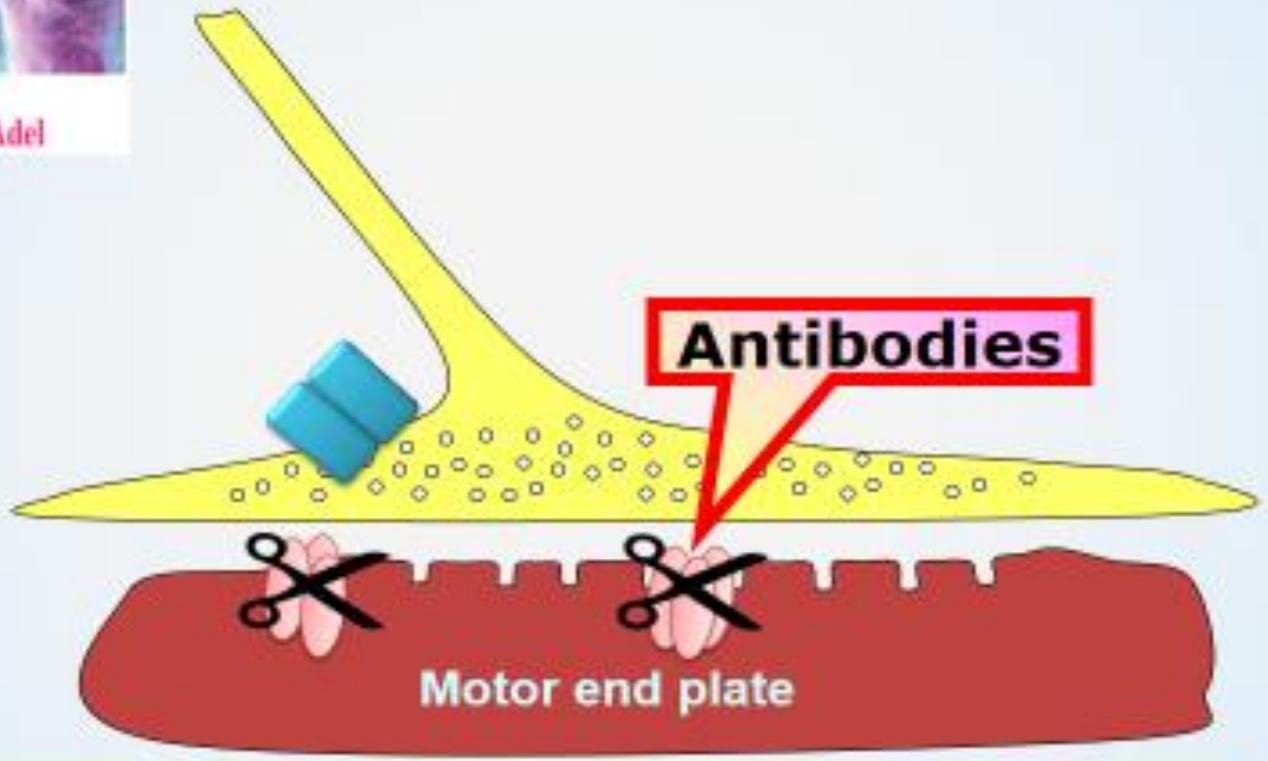

Myasthenia gravis

Myasthenia gravis

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Clinical picture:

- The motor end plate potential is very weak and the muscle fails to contract.
- The first muscles to be affected are those supplied by cranial nerves e.g eye muscles.
- In severe cases there is:

i- General muscle weakness.

ii- Death may occur due to respiratory muscle paralysis.

Myasthenia gravis

Diagnosis:

1- Electromyogram.

2-Therapeutic test: the patient is given a dose of prostigmine, if improved this confirms the diagnosis.

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Muscles

- There are three types of muscles: skeletal, smooth and cardiac muscles.
- Skeletal muscles constitute 40% of the body weight.
- 10 % of the body weight is smooth muscle and cardiac muscle.

Skeletal muscles

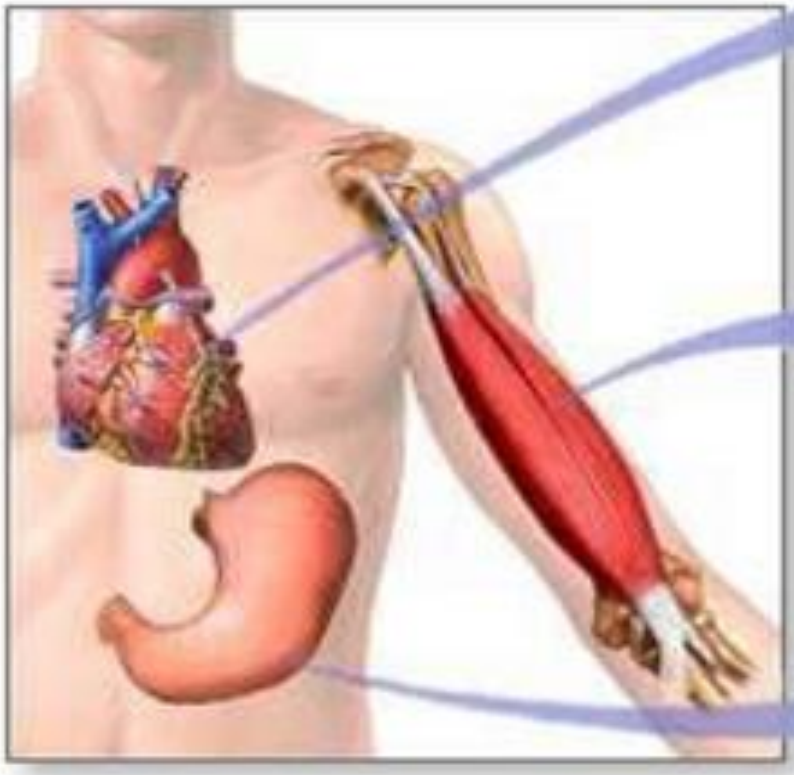
They are called:

i) Skeletal: as they are attached to skeleton.

ii) Somatic: as they move the body (soma).

iii) Voluntary: under voluntary control.

IV) Striated: as they appear striated under the microscope.



Cardiac muscle cell

Skeletal muscle cell

Smooth muscle cell

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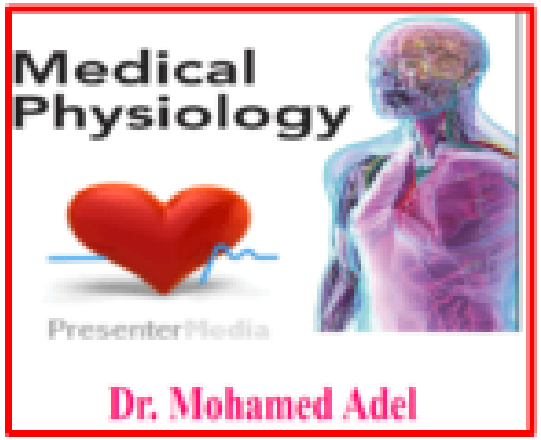
A.D.A.M.

Functions of the skeletal muscles

1) They move the body or part of it.

2) They maintain body posture by muscle tone.



Muscle fiber

1. Has an **outer membrane** called "**sarcolemma**"
2. The muscle fiber (Myofiber) cytoplasm is known as the **sarcoplasm** contains Mitochondria., Sarcoplasmic reticulum (SR)., Golgi apparatus., Ribosomes, Glycogen.Myofibrils. The muscle fiber is the structural unit of the skeletal muscle.

Functional histology of the skeletal muscles

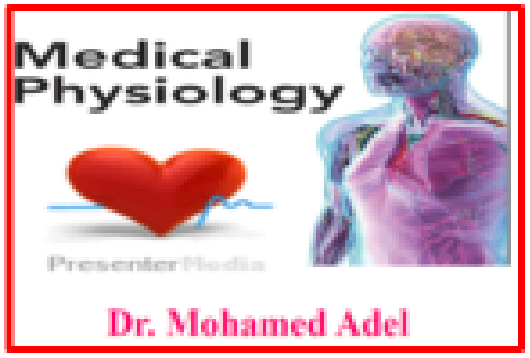
- A skeletal muscle is made up of thousands of muscle fibers (myofibers).
- The muscle fiber is the structural unit of the skeletal muscle. It is elongated, multinucleated cell of about 10-100 um in diameter.

Functional histology of skeletal muscles

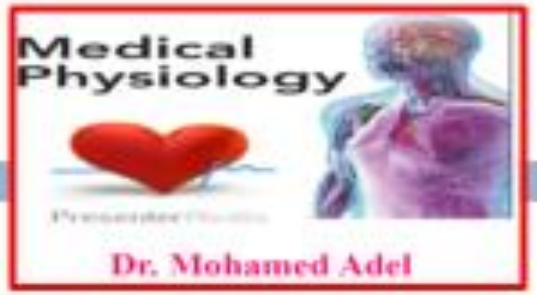
- The cell membrane has tubular extensions called transverse tubules (T-tubules) which extend deep into muscle fibers.

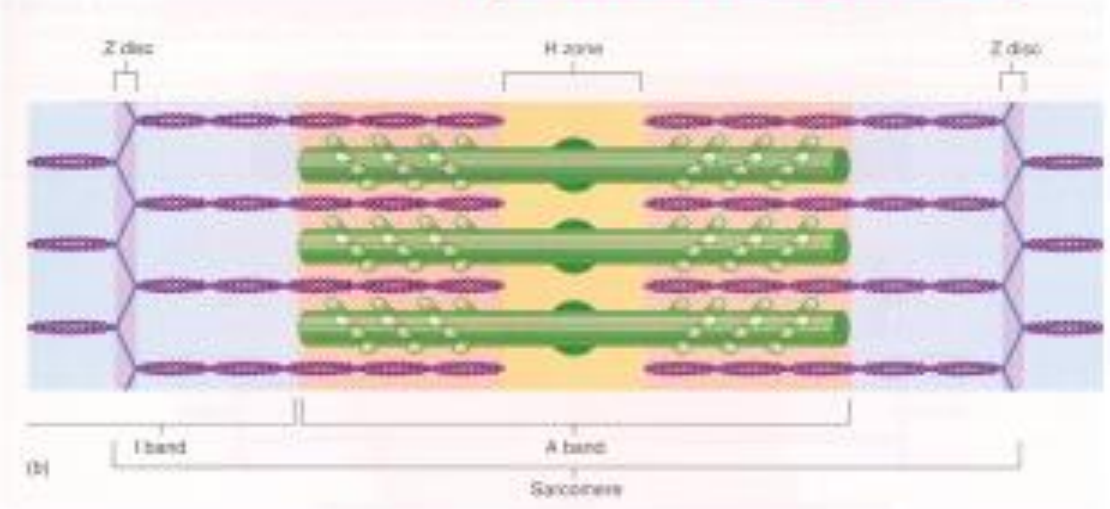
Myofibrils (1 micron in diameter)

- They extend from one end of the muscle to the other giving muscle fiber its longitudinal striations.



Sarcomere

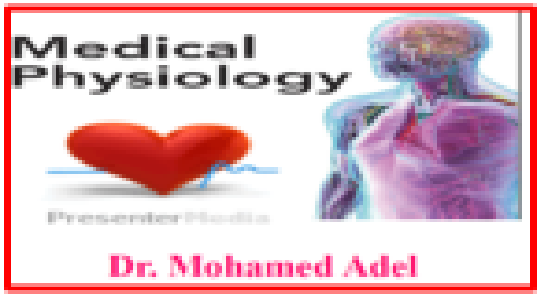




- **Definition:** Functional units of the **myofibrils**.

- Each myofibril shows alternation of light (I) and dark (A).
- These bands give skeletal muscle its transverse striations.

- In the center of the A-band there is a lighter zone called H zone and in the center of the H zone there is a dark line called M-line.
- In the center of the I-band there is Z-line.

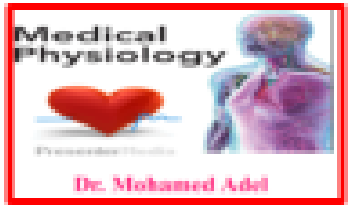


Sarcomere

- It is the functional unit of the muscles.
- It is formed of A-band and half of I-bands on each side.
- It is composed of myofilaments (contractile filaments) which are:

i)Thick filaments.

ii)Thin filaments.



Sarcomere

i) Thick filaments: present in the middle of sarcomere producing the A band and are attached by M-line.

ii) Thin filaments: present on both sides of the sarcomere attached by Z-lines.

Sarcomere

The space between thick and thin filaments is bridged by projections known as cross bridges which are parts of thick filaments.

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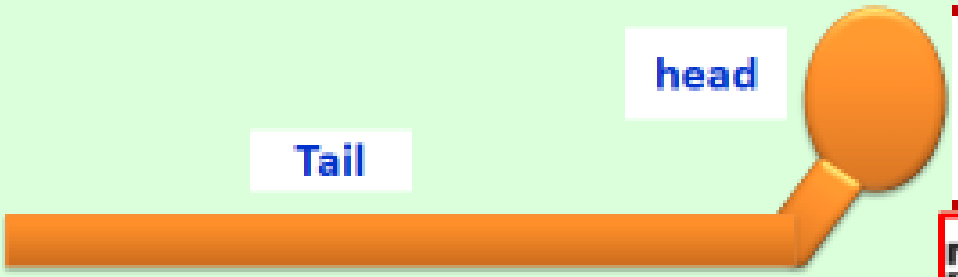
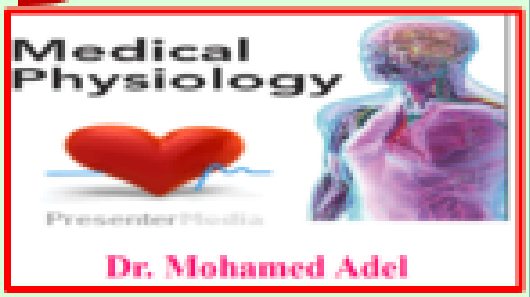
Thick filaments

- It is formed of myosin protein molecules.





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