MYOLOGY

It is that science deals with or study muscles and their accessory structures such as fasciae and synovial membranes.

Muscles: A muscle is a group of muscle tissues which contract together to produce a force. A muscle consists of fibers of muscle cells surrounded by protective tissue, bundled together many more fibers, all surrounded in a thick protective tissue. A muscle uses ATP to contract and shorten, producing a force on the objects it is connected to. There are several types of muscle, which act on various parts of the body.

The muscles are highly specialized organs composed of contractile tissue mainly.

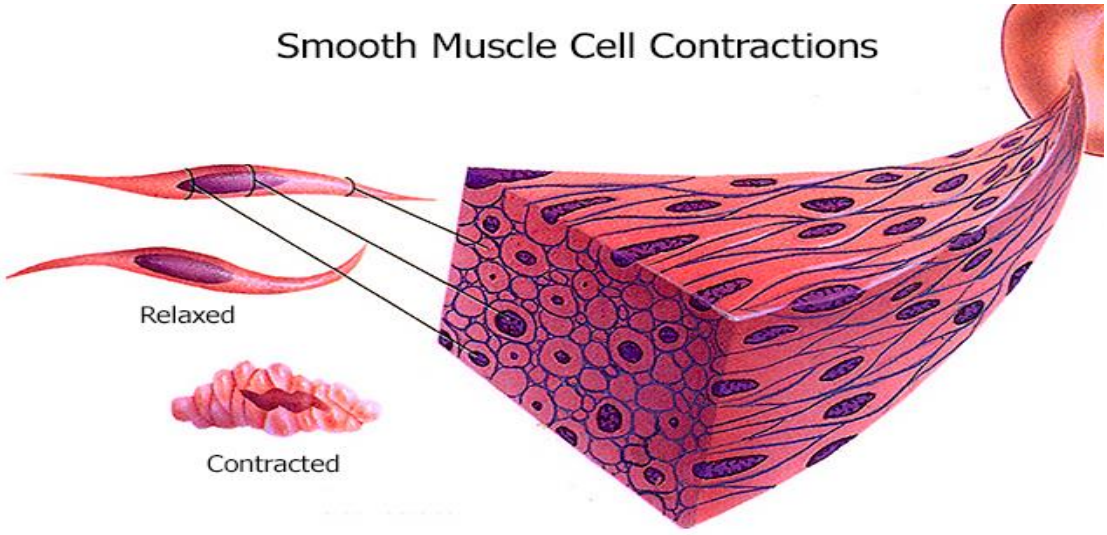
Classification:

Muscle tissue is classified both morphologically and functionally into:

1. Smooth muscles (nonstriated, involuntary).
2. Cardiac muscles (striated, involuntary).
3. Skeletal muscles (striated, voluntary).

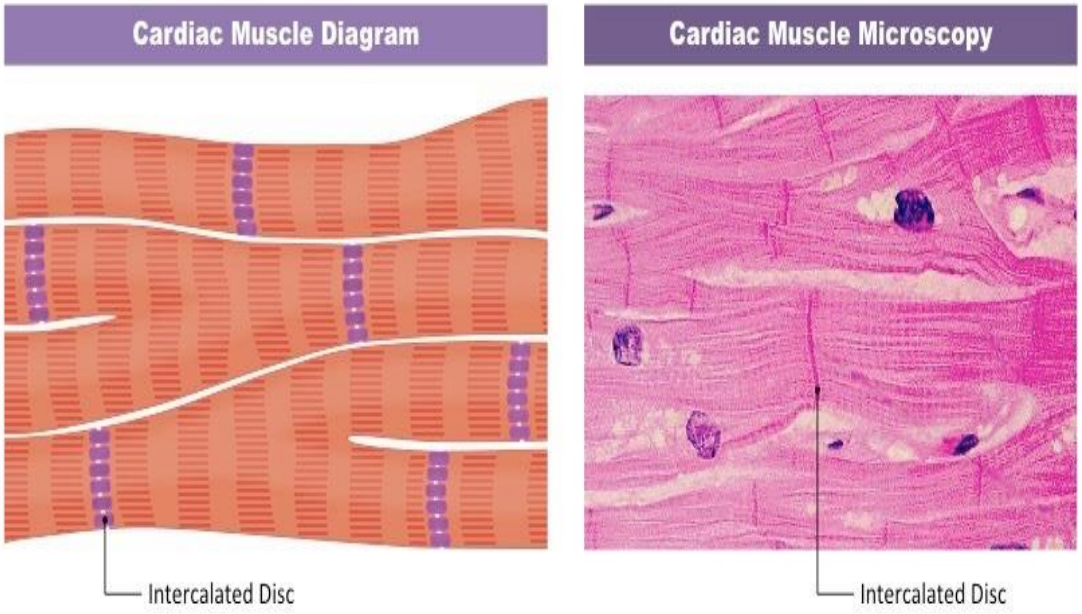
Smooth muscles: characterized by:

1. The fibers of these muscles are spindle–shaped cells with centrally located nucleus, and present as a masses in the wall of hallow organs like "digestive, respiratory and urogenital tracts" and blood vessels, also in glands, spleen, and hair follicles.
2. Contraction is weak, and its action involuntary but sustained and mostly rhythmic. It’s called nonstriated or involuntary or visceral muscles.
3. It has no origin or insertion.



Cardiac muscle: It is characterized by:

1. The fibers of these muscles have cross striation and the nuclei located centrally. The fibers arranged in an irregular masses with the end of some fibers contraction the sides of each other by intercalated discs (which
2. they are dark bands extend transversely across one or more muscle fibers. These fibers are present only in heart and has purkinje fibers.
3. The action is involuntary and their contraction is rhythmic.



Skeletal muscle: it characters by:

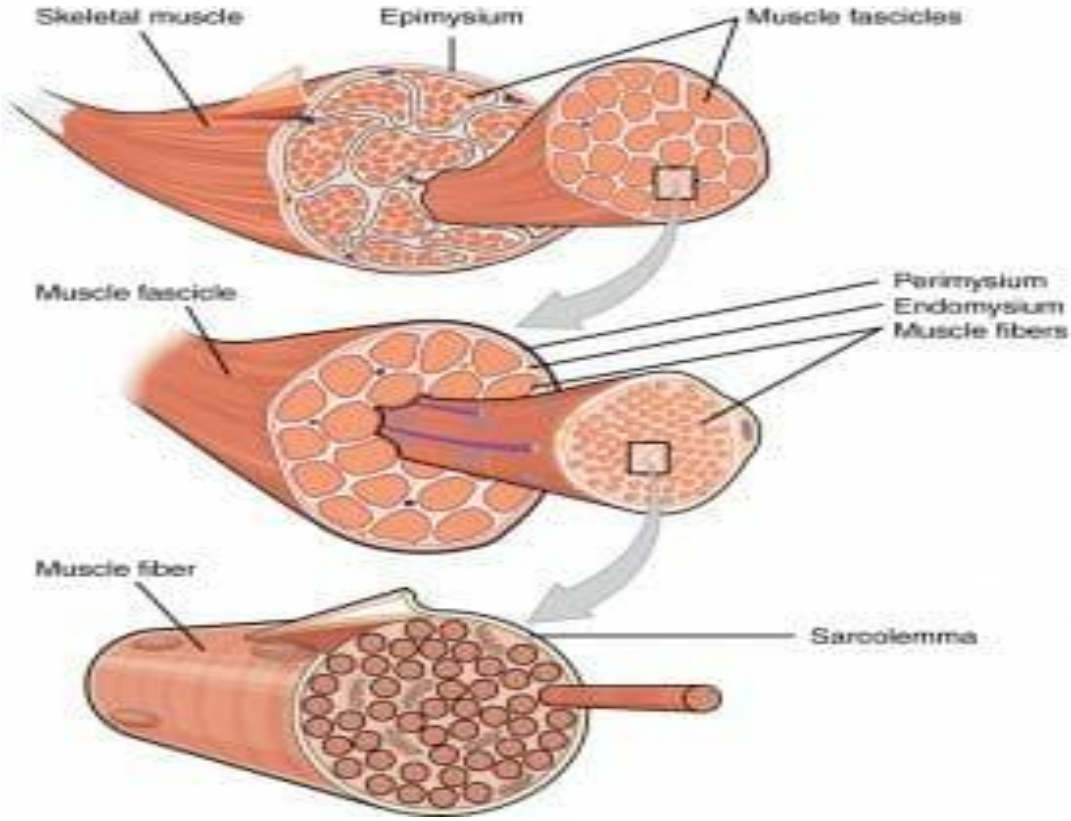
1. The fibers of these muscle are:

a) Long unbranched multinucleated which have longitudinal myofibrils and cross striations.

b) Consists of sarcoplasm, sarcolema, myofibrils and peripherally located nuclei.

c) Invested by a connective tissue which are:

1. Endomysium: the connective tissue which present between the skeletal muscle fibers.
2. Perimysium: the connective tissue which surrounds each bundle of skeletal muscle fiber “fasciulus".
3. Epimysium: the connective tissue sheath which surrounds the entire muscle.



Fasciculus:

1. It’s a bundle of skeletal muscle fibers, surrounded by connective tissue the perimysium.
2. Muscles are covered with the connective tissue the fascia.
3. The connective tissue of muscle is continuous or attached with the connective tissue of the bone "Periosteum" or connective tissue of other muscles.
4. Each skeletal muscle is supplied by bundles of nerve fibers, and blood vessels through the deeper portion of the muscle.
5. There are two types of muscles attachment:

a) Fleshy.
b) Tendinous.

a) Fleshy attachment: The areas of this attachment are usually smoother, but may be representing by indistinct lines.
b) Tendinous attachment: It represented by "Tendon and aponeurosis", which are a fibrous tissue on each end of skeletal muscle connected either with bone or with the other muscles "some time".

Tendon: It’s a band of dense white connective tissue by which a muscle is attached to the other structures "like bones or tendon of other muscles". The tendon is usually thinner than the muscle.

Aponeurosis: It is abroad fibrous sheath by which a muscle is attached.

6. Muscles which support the body in standing position would tend to have a preponderance of dark fibers.

ACCESSORY STRUCTURES
Of
"SKELETAL MUSCLES"

1. **Fasciae:** These are connective tissue membranes separating muscles from each other and binding them into position. There types are superficial and deep fasciae.

Superficial Fascia: Its more loosely packed layer next to the skin (subcutaneous). It is often fat-laden.

Deep fascia: It is definite layer investing the groups of muscles and sending intermuscular septa.

2. **Synovial membranes:** These are thin–walled sacs, similar to Synovial membranes of Synovial joints and have similar function. There types are synovial bursa and synovial sheath.

A) synovial bursa :

It is a small sac of connective tissue contained amount of synovial liquid located or occurs between the tendon and the bone when the pressure exists against a portion of the bone.
Bursas may develop subcutaneously of pressure points.

B) Synovial sheath:

It is a sac folded a rounded the tendon. It consists of two portions or layers "inner and outer", these portions are continuous. The connection portion is double, forming the mesotendon.
The proximal pole of the synovial sheath contains a sickle-shaped fold, which permits the sheath to remain a closed cavity while allowing free movement of the tendon.

Description of muscles:

Muscles are described depending on the following heads:

1. Name.
2. Shape.
3. Attachments.
4. Structure.
5. Blood and nerve supply.
6. Action.

1. Name:

Giving the name of muscle is depending on some considerations:

1. On its action ----e.g. Flexor carpi radialis.
2. On its direction----e.g. Extensor carpi obliqaus.
3. On its position----e.g. Rectus abdominus.
4. On its shape-----e.g. Sphincter ani or ring-like.

2. Shape:

Triangular, quadrilateral, fusiform, broad, long or short.
e.g. ---- Long digital extensor muscle.
e.g. ----- Quadratus Femoris muscle.

3. Attachments:

Its may be origin or insertion.
Origin: It's the more fixed attached end of the muscle during contraction.
Insertion: It's the more moveable attached end of the muscle during contraction.

4. Action:

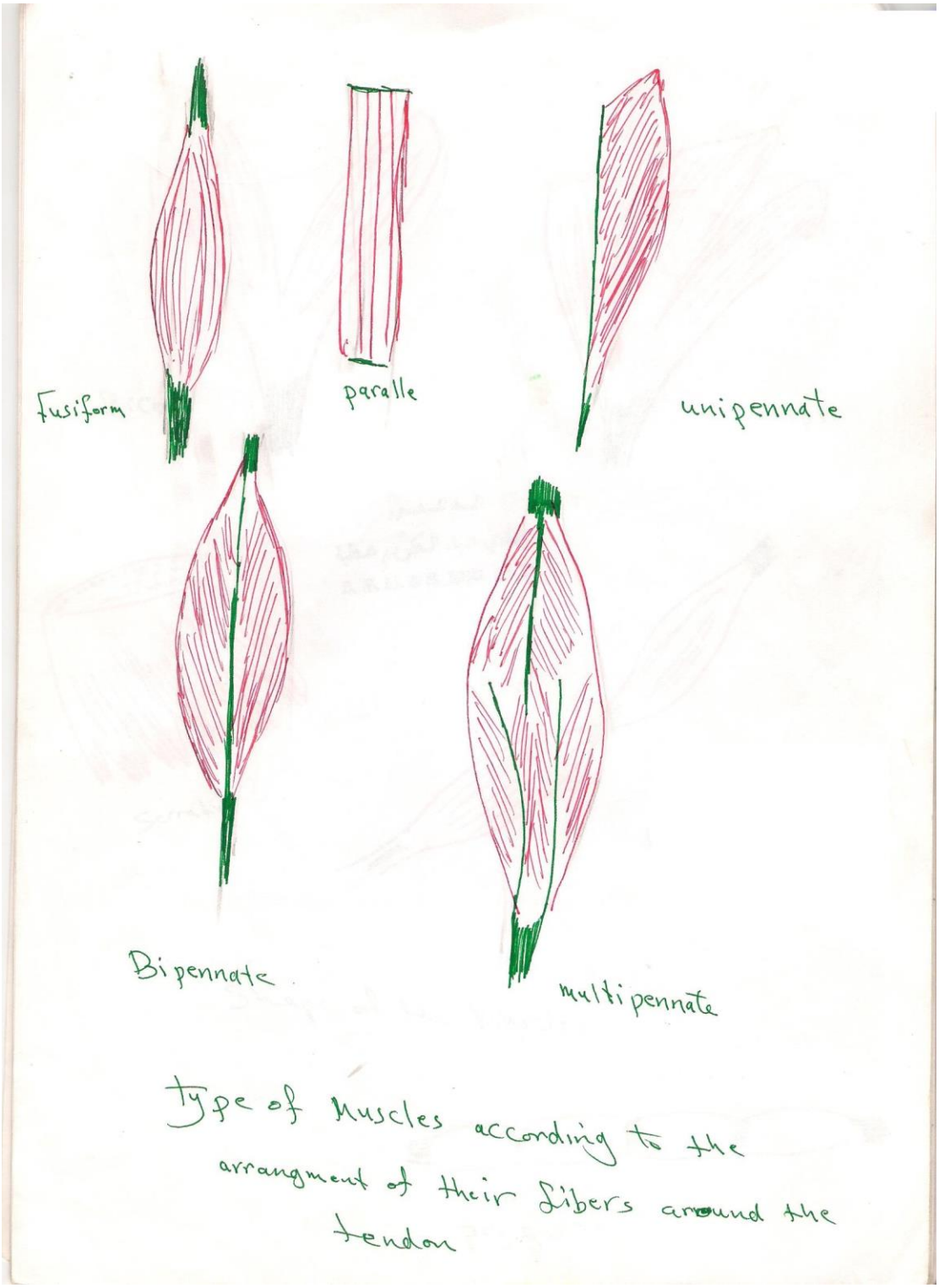
The action of muscles may be simple or complex.
Synergists: muscles which are concur in their actions.
Antagonists: muscles which have opposite action.

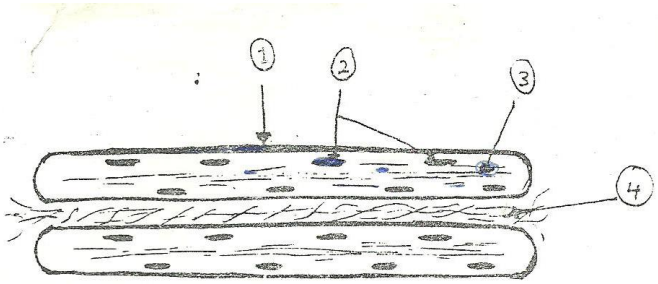
5. Structure:

It is including:

a) Studding of direction of muscle fiber (Fusiform, Parallel).
b) Studding the attachment of it's tendon.

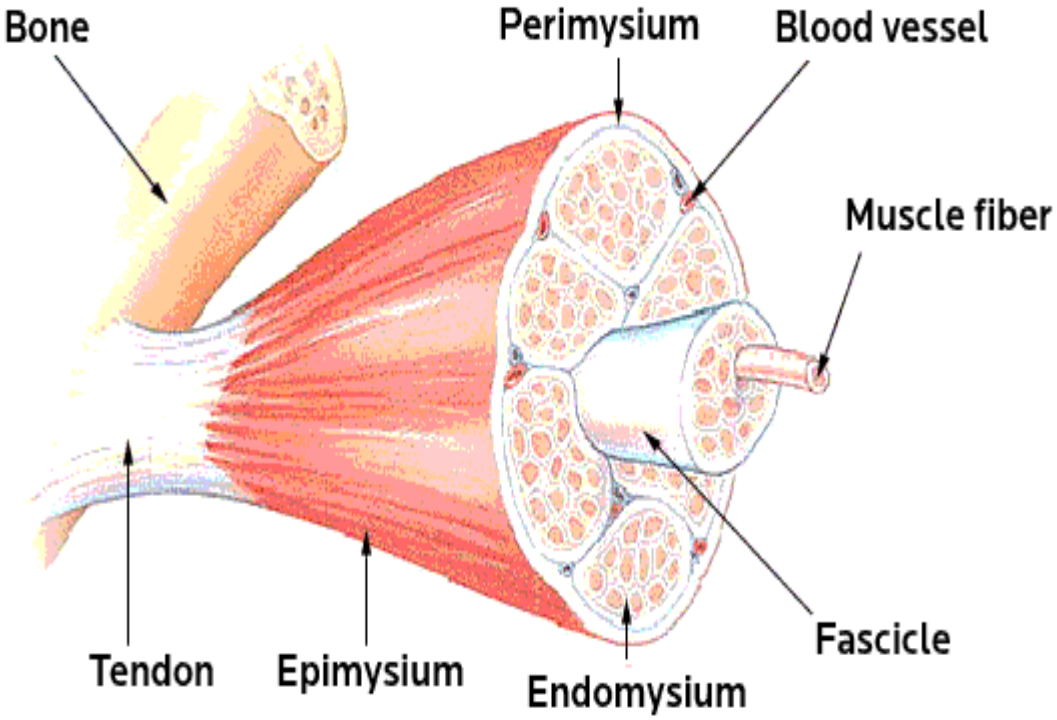
c) Studding the nature of origin or head, Its may be "biceps, triceps, quadriceps".
d) Studding the nature of belly of the muscle which may be large fleshy or small.
e) Studding the arrangement of muscle fibers around the tendon which may be "unipennate, bipennate or multipennate".





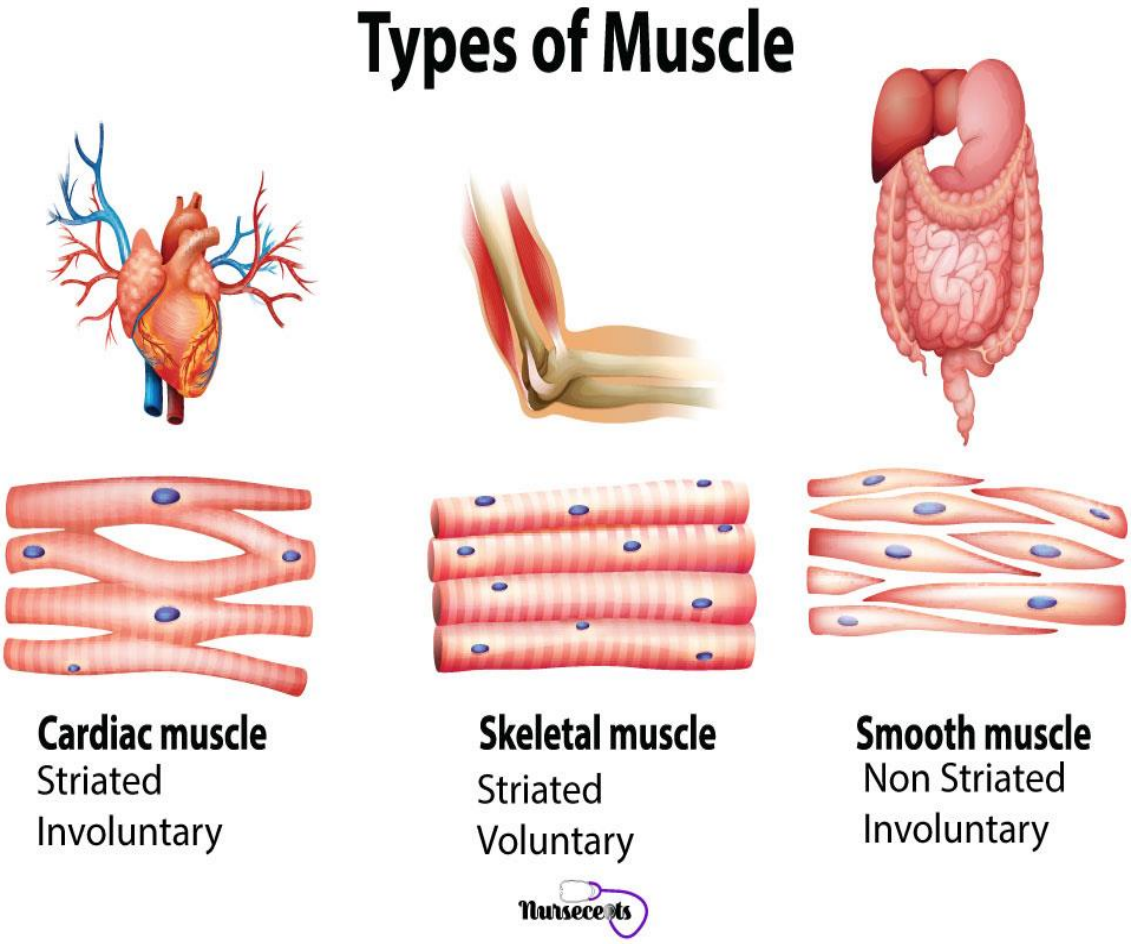
Longitudinal skeletal muscle fibers.

1. Sarcolema.
2. Nucleus (nuclei).
3. Myofibrils in sarcoplasm.
4. Connective tissue endomysium.



Cross section in skeletal muscle

1. Epimysium.
2. Perimysium.
3. Endomysium.
4. Sarcolema.
5. Muscle fiber.
6. Blood vessels.



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