MYOLOGY

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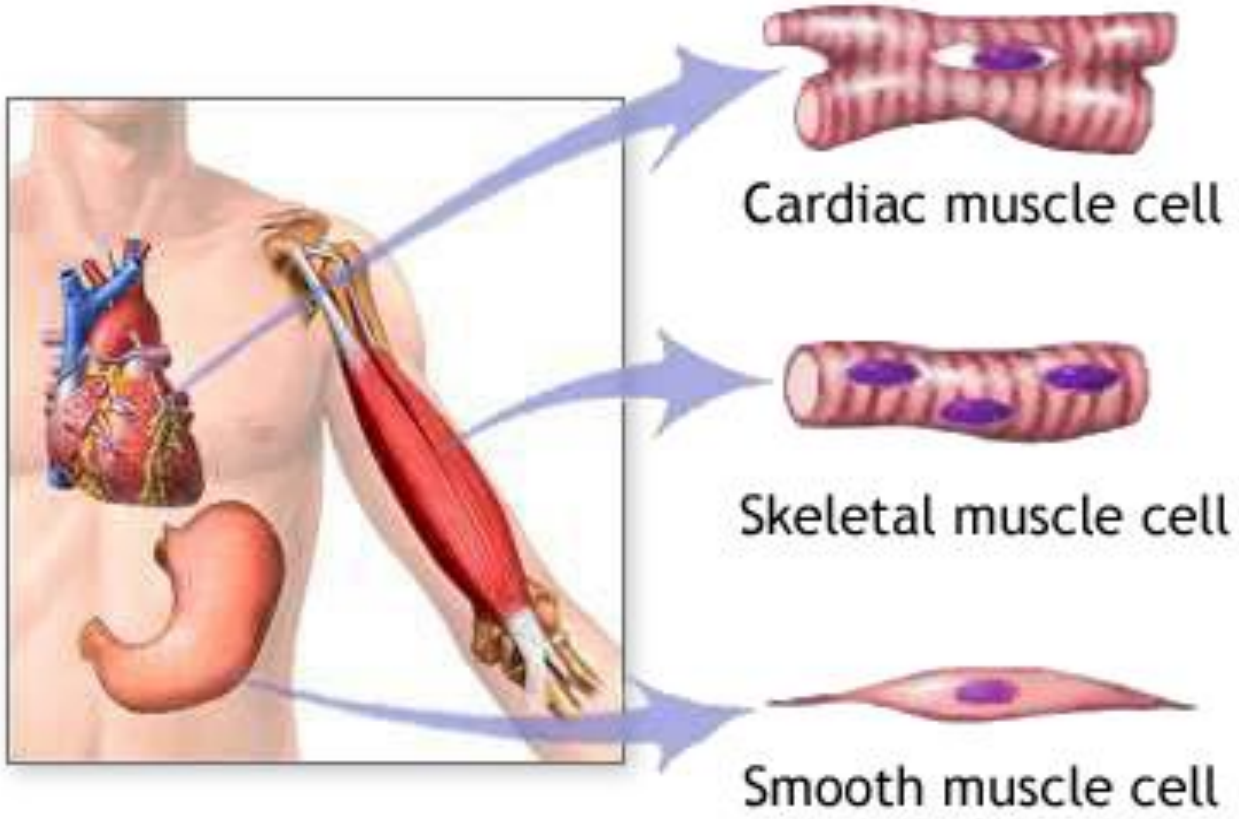
- Myology is the study of muscles.
- More than 600 skeletal muscles make up the muscular system.

Types of muscles



- These three types differ in structure and function.

The following basic properties characterize all muscle tissue:

1. **Irritability-** Muscle tissue is sensitive to stimuli from nerve impulses.
2. **Contractility-** Muscle tissue responds to stimuli by contracting lengthwise, or shortening.

3. **Extensibility-** Once a stimulus has subsided and the fibres within muscle tissue are relaxed, they may be stretched even beyond their resting length by the contraction of an opposing muscle. The fibres are then prepared for another contraction.
4. **Elasticity-** Muscle fibres, after being stretched, have a tendency to recoil to their original resting length.

Skeletal muscle

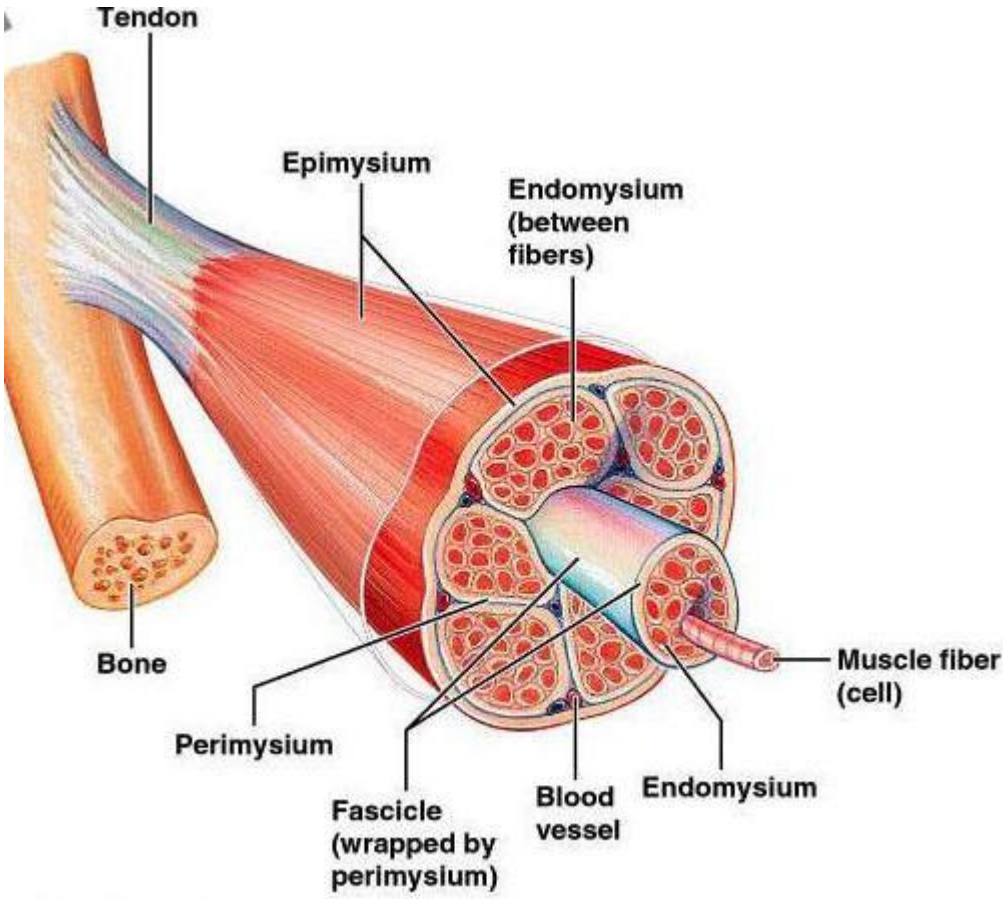
it is attached primarily to bones and it moves parts of the skeleton.

It consists of parallel bundles of long, multinucleate fibres. This type of muscle is capable of powerful contractions because of the regular organization of its contractile proteins.

It is innervated by somatic motor nerves.

It is referred to as voluntary muscle, because the movements in which it participates are often initiated under conscious control.

Macroscopic structure of skeletal muscle



- Skeletal muscle tissue, in association with connective tissue, is organized into muscle bundles. This muscle architecture determines the force and direction of the contracting muscle fibres. Muscle fibres may be organized with parallel fibres, convergent fibres, pinnate fibres and sphincter or circular fibres.

Four different types of skeletal muscles:

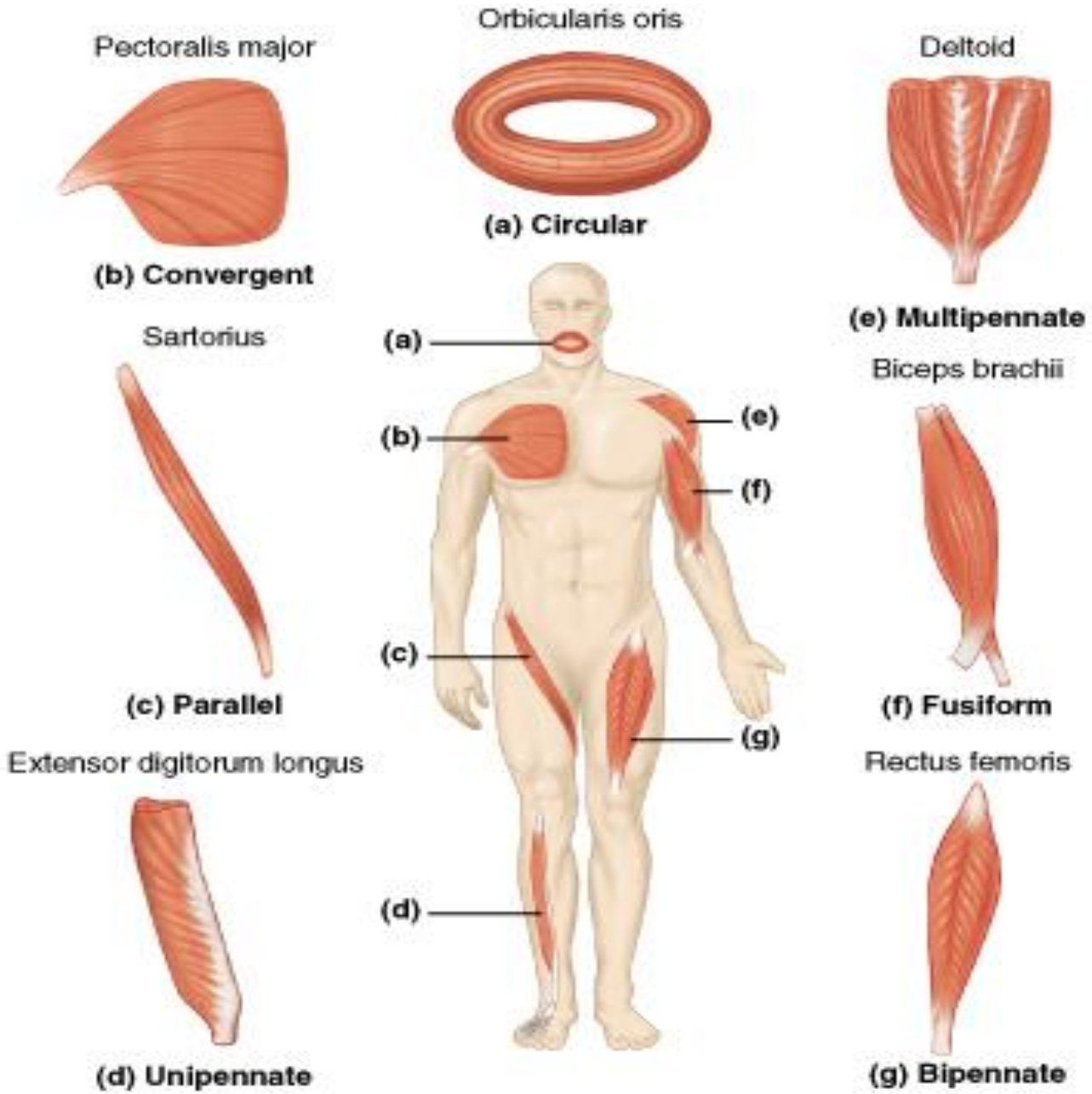
1. **Parallel muscles:** They are also known as strap muscles and their fibres run parallel to each other. They are long muscles which cause large movements, are not very strong but have good endurance. E.g. sternocleidomastoid, sartorius.

- Fusiform muscle: Fibres are arranged parallel with a wider belly and narrow ends. e.g. biceps brachii.

2. **Convergent muscles:** This type of muscle has a wider origin and the muscle fibres converge to its insertion. These fibres arrangements allow maximum force of contraction. E.g. pectoralis major.
3. **Pinnate muscles:** They contain large number of muscle fibres per unit so are very strong but tired easily. These are three types-

- **Unipinnate:** The muscle fibres are arranged to insert in a diagonal direction onto the tendon. E.g. include lumbricals and extensor digitorum longus.
- **Bipinnate:** The muscle fibres are arranged in two rows, facing in opposite diagonal direction with a central tendon like a feather. E.g. rectus femoris.
- **Multipinnate:** The multipinnate muscles have multiple rows of diagonal fibres with a central tendon which branches into two or more tendons. E.g. deltoid.

4. **Sphincter muscles:** These muscles appear circular in shape and are normally surrounding an opening such as the mouth surrounded by orbicularis oris and orbicularis occuli surrounding the eyes.


Pectoralis major
(b) Convergent
Orbicularis oris
(a) Circular
Deltoid
(e) Multipennate
Sartorius
(c) Parallel
(a)
(b)
(c)
(d)
(e)
(f)
(g)
Biceps brachii
(f) Fusiform
Extensor digitorum longus
(d) Unipennate
Rectus femoris
(g) Bipennate

Loose fibrous connective tissue binds muscle at various levels to unify the force of contraction. Surrounding each muscle fibre is a connective tissue called the endomysium. A group of individual fibres is bound together by another connective tissue, the perimysium, to form a fasciculus.

Many fasciculi make up an individual muscle. Each muscle is surrounded by a third connective tissue, the epimysium. These three connective tissues are continuous with the tendon that secures the muscle to bone.