

Lab: 5

Muscle tissue

Is a soft tissue composed of cells specialized for contraction, this tissue is responsible for movements in our body (Muscles function to produce force and motion), they are primarily responsible for maintaining and changing posture, locomotion, as well as movement of internal organs, such as the contraction of the heart and the movement of food through the digestive system via peristalsis.

- Muscle cells contain special proteins called contractile protein which contract and relax to cause movement, protein filaments of actin and myosin that slide past one another, producing a contraction that changes both the length and the shape of the cell.

Types of Muscle

Tissues Muscle is classified into three types according to their structure and function they are vary with function and location in the body

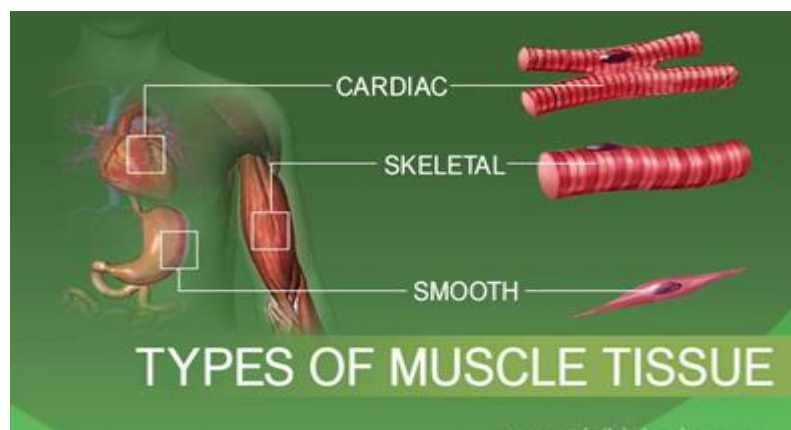
- **Skeletal muscle**

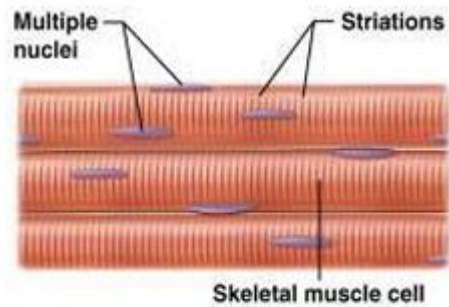
Skeletal Muscle Characteristics

- *Most are attached by tendons to bones •
- *Elongated cells cylindrical •
- * Cells are multinucleate with peripheral nuclei •
- * Striated - have visible banding (actin and myosin filaments form distinct cross striation patterns
- * Voluntary •

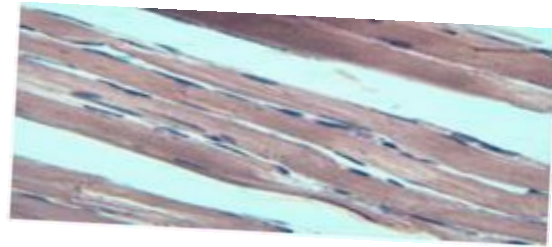
Location : • Skeletal muscles attached to bones or occasionally to skin (except striated muscles of tongue ,pharynx, upper esophagus) •

Function : Voluntary movement, locomotion manipulation of the environment, facial expression





(a) Skeletal muscle tissue



*Cardiac muscle

Also called **heart muscle** or **myocardium** **Cardiac Muscle**

Tissue characteristics

* Involuntary control

*With intercalated discs

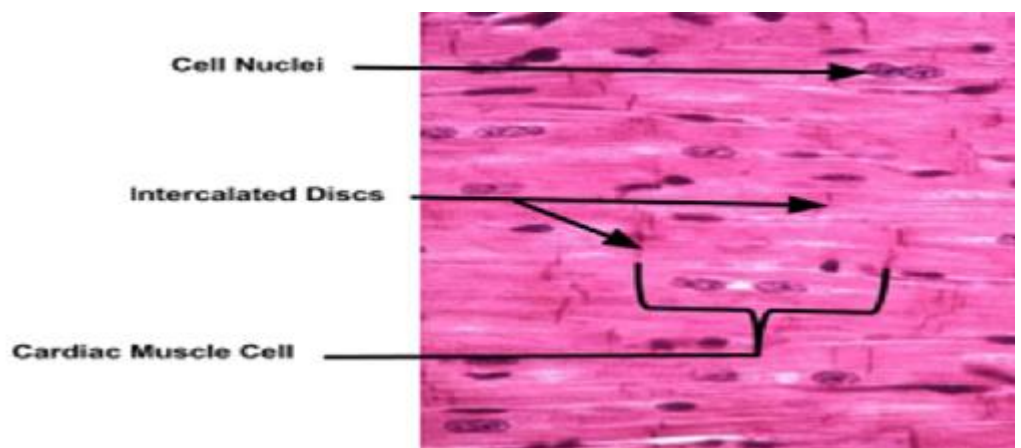
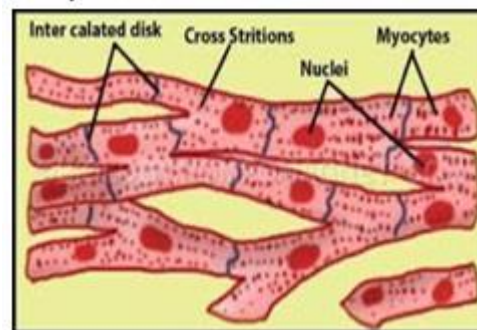
*Striated muscle (cardiac muscle fibers exhibit distinct cross-striations result of the arrangement of actin and myosin filaments)

*Shorter and branched cells

*Uni- or bi- central nucleated

Location constitutes the main tissue of the walls of the heart

Function As it contracts, it propels blood into the circulation



*Smooth muscle

Smooth Muscle Characteristics

*Its fibers have no Individual externally visible striations, so named smooth muscle.

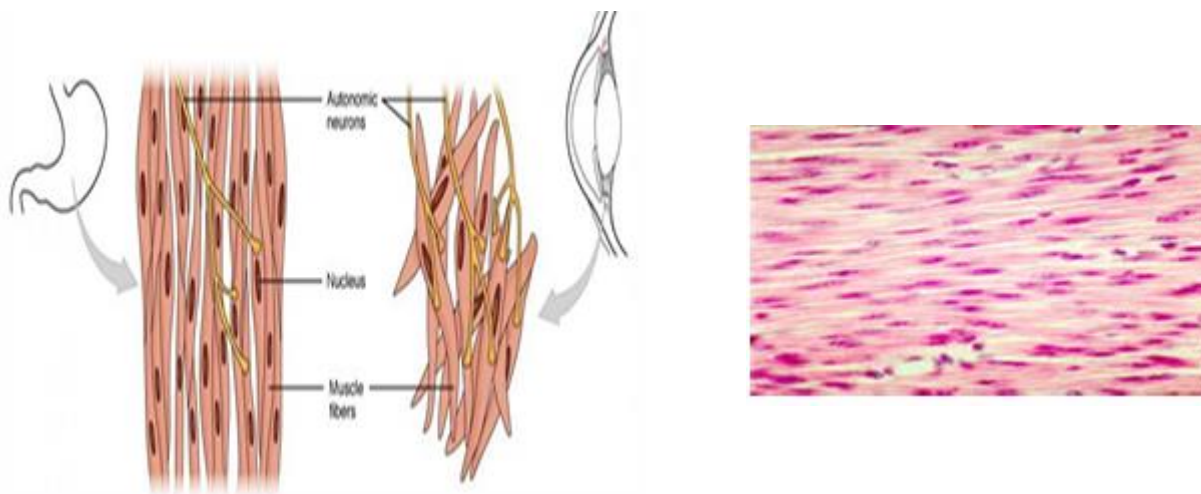
* Smooth muscle cells spindle shaped and contain one centrally located nucleus .

*Non striated

*Involuntary control

Location : Smooth muscle occurs mainly in the walls of hollow organs (digestive and urinary tract organs, uterus and blood vessels)

Function : Acts to propel (squeeze) substances or objects (food stuffs , urine , a baby) along internal passage ways by alternately contraction and relaxing .



Nervous tissue

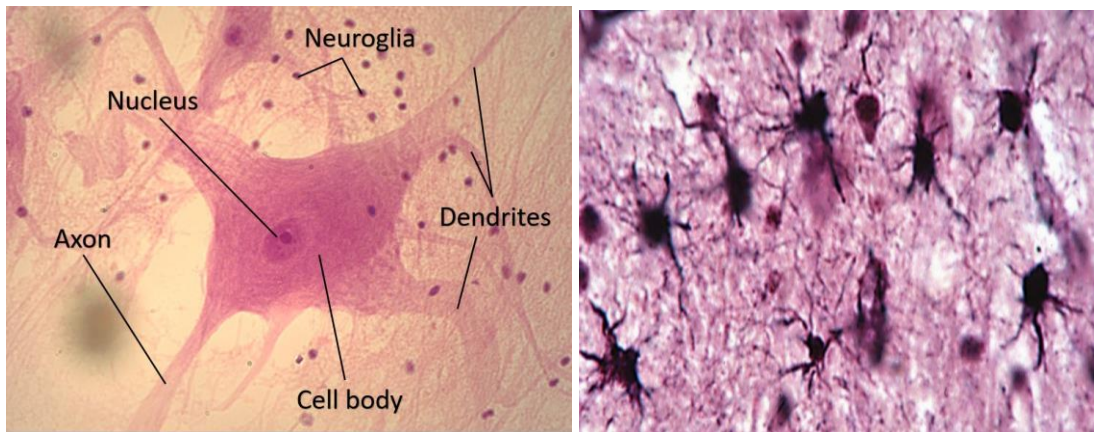
Nervous system is specialized for the rapid communication of information from one region of the body to another.

Nervous system is divided **anatomically** into two major components:

- **Central nervous system (CNS)** – consists of the brain and spinal cord
- **Peripheral nervous system (PNS)** – peripheral nerves and ganglia

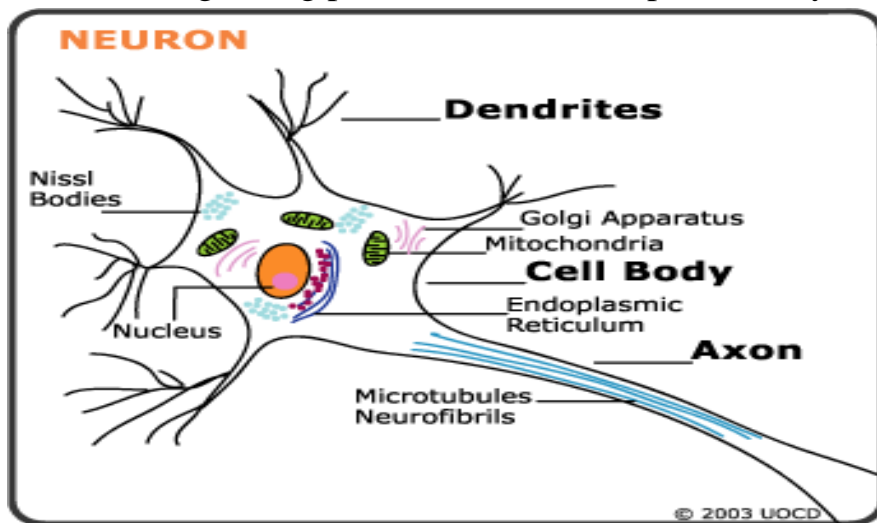
Nervous system is divided **functionally** into two major components:

- **Somatic nervous system** – conscious voluntary movements
- **Autonomic nervous system** – regulates the functions of internal organs - further divided into two subdivisions:
 - **Sympathetic nervous system** – involved in functions requiring quick responses (*i.e.*, stress, impending danger, and fight or flight response)
 - **Parasympathetic nervous system** – regulates functions that do not require a quick response



Neuron Consists of:

- **Cell Body** : contains Nucleus, Mitochondria, Nissl bodies
- **Dendrites**: highly branched extensions of the cell body. Conduct impulses towards the cell body
- **Axon**: a single long process. Conducts impulses away from the cell body.



- **Types of neurons**

- **Multipolar neurons.** These neurons have a single axon and symmetrical dendrites that extend from it. This is the most common form of neuron in the central nervous system.
- **Unipolar neurons.** Usually only found in invertebrate species, these neurons have a single axon.
- **Bipolar neurons.** Bipolar neurons have two extensions extending from the cell body. At the end of one side is the axon, and the dendrites are on the other side. These types of neurons are mostly found in the retina of the eye. But they can also be found in parts of the nervous system that help the nose and ear function.
- **Pseudounipolar neurons** consist of one short process, which splits into two other processes. The pseudounipolar neurons are sensory in nature, and the axonal processes receive and transmit the information. They are located in the sensory ganglia of cranial nerves.

