

Basic Medical Science

FSC TECHNICIANS I

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MUSCLE TISSUES

OVERVIEW:

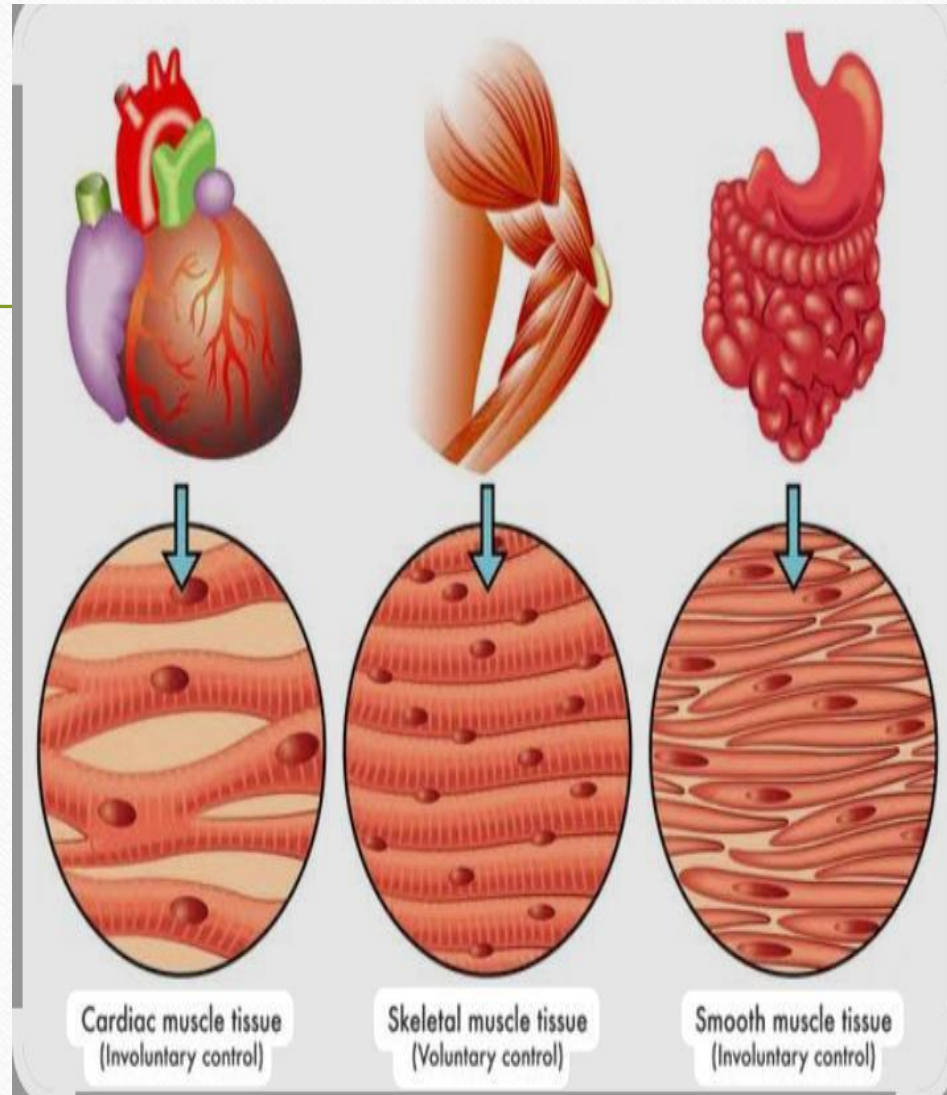
- ***Definition*:** Muscle tissues are specialized tissues composed of cells called muscle fibers or myocytes.
- **Properties*:** They possess unique contractile properties.
- **Functions:** Allow for movement and force generation in the body.

TYPES

- **Skeletal muscles**
 - - Attached to bones
 - - Responsible for voluntary movements like walking, running, lifting weights
- **Cardiac Muscle**
 - - Forms the heart
 - - Responsible for involuntary contractions that pump blood throughout the body

Continued

- **Smooth muscles**
- - Found in the walls of hollow organs like the intestines, blood vessels, and airways.
- - Controls involuntary movements.
- - Functions include peristalsis and regulating blood flow.



Structure of Muscle Fibers

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- - Muscle fibers are elongated cells containing multiple nuclei and arranged parallel to each other.
- - Each muscle fiber is surrounded by connective tissue called endomysium, which provides support and facilitates nutrient exchange.
- - Muscle fibers contain myofibrils, which are contractile structures composed of repeating units called sarcomeres.
- - Sarcomeres contain thick myosin filaments and thin actin filaments that slide past each other during muscle contraction.



Contractile Mechanism

- - Muscle contraction is initiated by the interaction between actin and myosin filaments within sarcomeres.
- - When stimulated by a nerve impulse, calcium ions are released , enabling actin and myosin to bind and slide past each other.
- - This sliding filament mechanism shortens the sarcomeres, causing the muscle fiber to contract.

Control of muscle contraction

- **Skeletal muscle contraction**
 - - Under voluntary control
 - - Stimulated by motor neurons from the central nervous system
- **Cardiac Muscle contraction**
 - - Involuntary
 - - Regulated by the cardiac conduction system (coordinates electrical impulses)
- **Smooth Muscle contraction**
 - - Involuntary
 - - Influenced by hormones, neurotransmitters, and local factors

Functions of Muscle Tissues

- **Skeletal muscle:**
 - - provides support, movement, and stability to the body.
 - - enables locomotion, posture maintenance, and fine motor control.
- - ***Cardiac Muscle:**
 - - ensures the continuous pumping of blood throughout the circulatory system.

Continued

- **Smooth Muscle:**
- - controls the movement of substances through hollow organs.
- - regulates blood vessel diameter.
- - contributes to various physiological processes such as digestion and respiration.

ANY
questions?

*Thank
you*

