

# Basic Medical Science

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FSC TECHNICIANS I

**DR DANISH NADEEM**

# MUSCLE TISSUES

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## 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

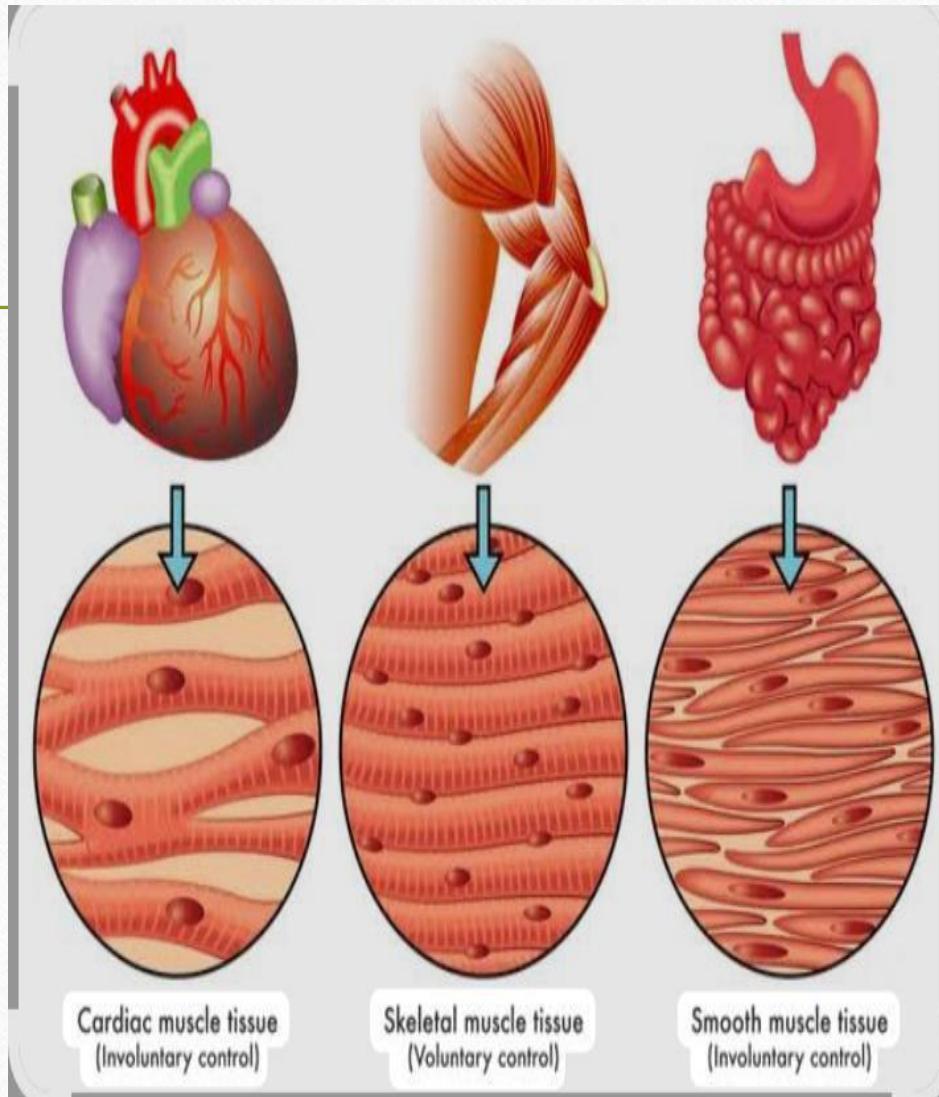
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- **Skeletal muscles**
  - - Attached to bones
  - - Responsible for voluntary movements like walking, running, lifting weights
- **Cardiac Muscle**
  - - Forms the heart
  - - Responsible for involuntary contractions that pump blood throughout the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

# Continued

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- **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.



**Parallel**  
*(abdominal muscles)*

# Contractile Mechanism

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- - 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

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- **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

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- **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

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



Thank  
you

