SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai

DEPARTMENT OF OPERATION THEATRE AND ANESTHESIA TECHNOLOGY

COURSE NAME: 1131 – BASIC SCIENCES - ANATOMY

UNIT I – BASICS OF ANATOMY

TOPIC: MUSCULAR TISSUES

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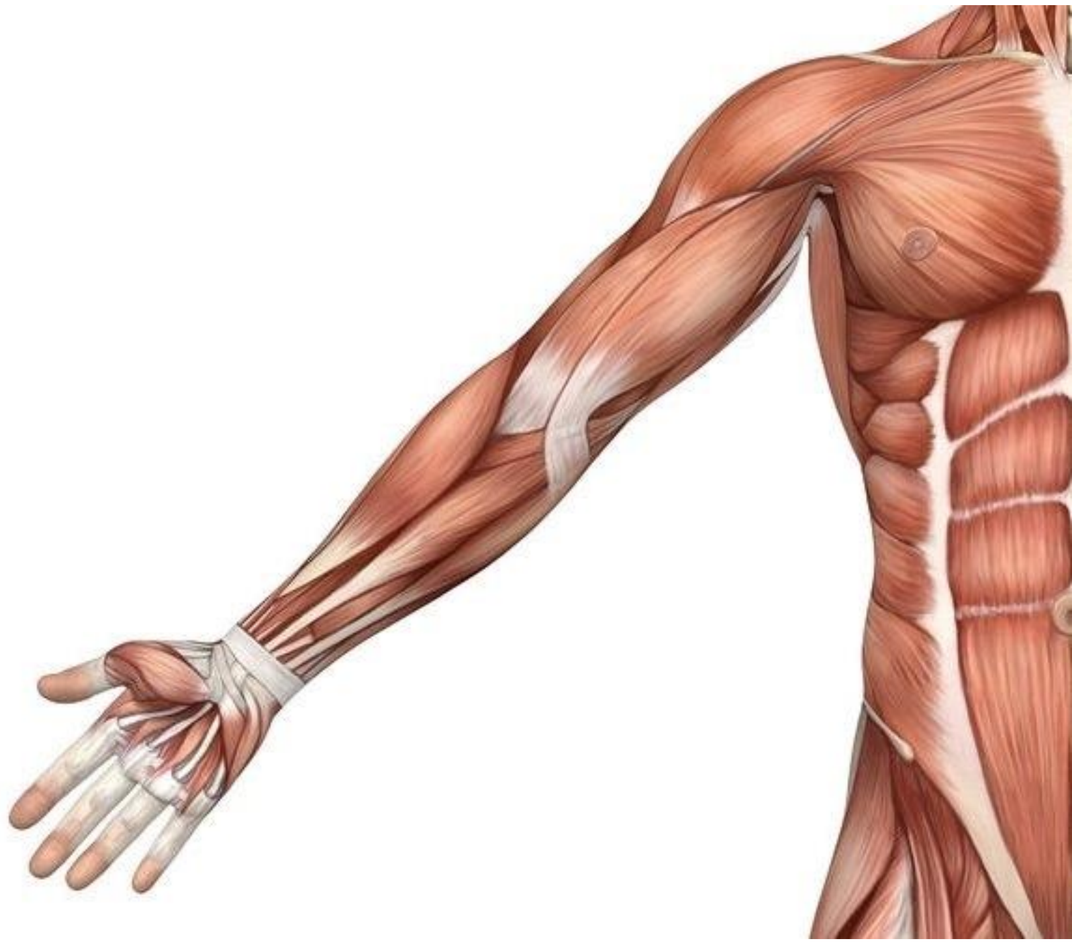
INTRODUCTION

- It is a specialized tissue for **movement**
- It is made of long cells called **muscle fibers**
- It contains proteins **actin and myosin** → allow contraction
- It can shorten forcefully when stimulated



CHARACTERISTICS

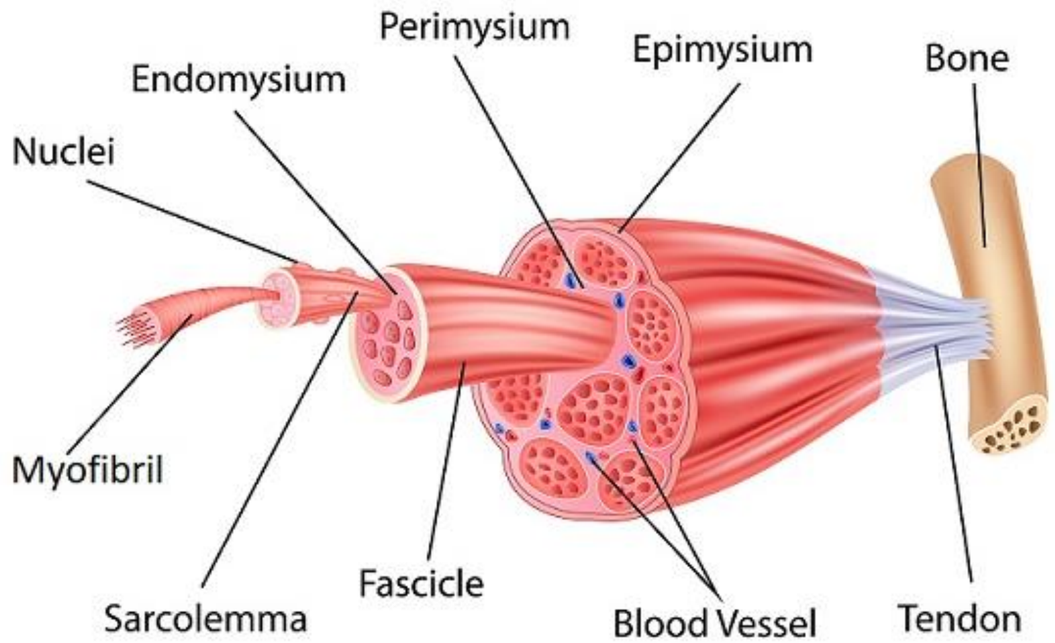
- **Excitability** – Can receive and respond to stimuli (electrical, chemical, or mechanical).
- **Contractility** – Ability to shorten forcefully and generate tension when stimulated.
- **Extensibility** – Can be stretched or extended without damage.
- **Elasticity** – Returns to original length after stretching or contraction.
- **Presence of actin and myosin filaments** – Contractile proteins responsible for movement

FUNCTIONS

- Body movement
- Maintaining posture and joint stability
- Thermogenesis
- Propelling substances through hollow organs
- Regulating organ volume and pressure
- Pumping blood
- Stabilizing and protecting internal structures

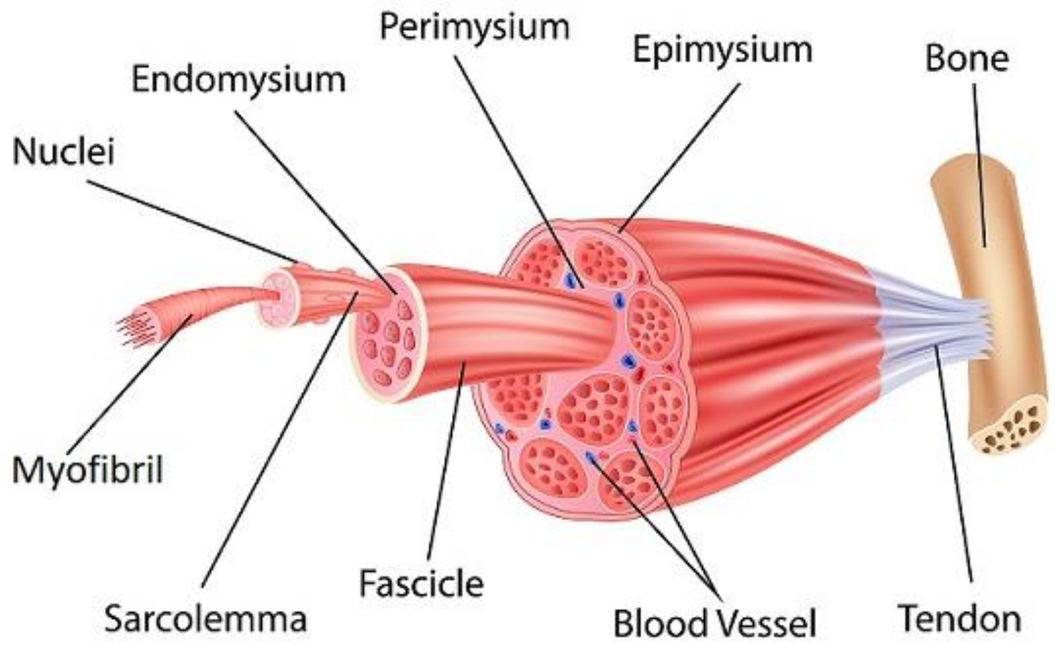
STRUCTURE

- **Muscle fiber** - Single, long muscle cell
- **Sarcolemma** - Plasma membrane of the muscle fiber
- **Endomysium** - Thin connective tissue layer that wraps each individual muscle fiber
- **Fascicle** - Bundle of muscle fibers (looks like a small cable inside the muscle)
- **Perimysium** - Tough connective tissue that wraps each fascicle (bundle)

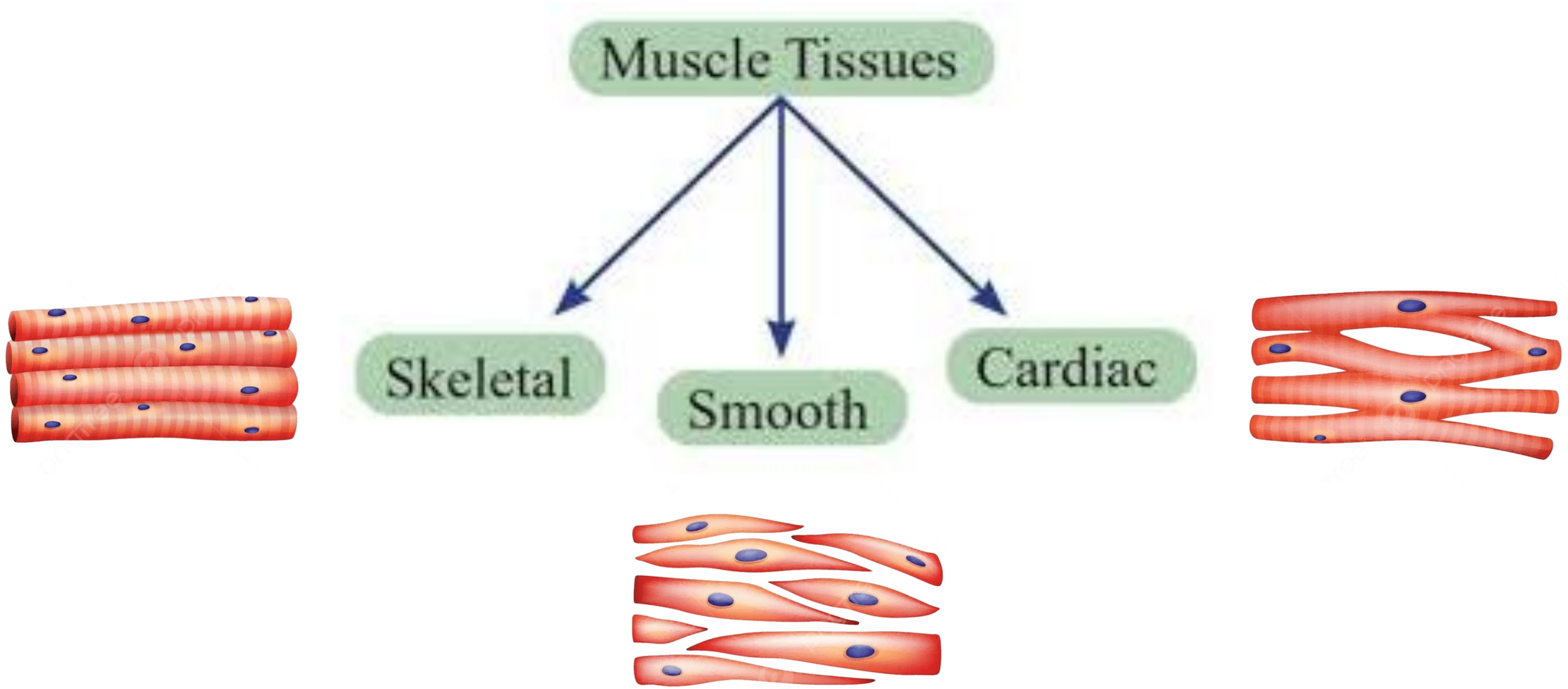


STRUCTURE (Cont)

- **Epimysium** - Thick outer connective tissue layer that covers the entire muscle
- **Tendon** - Epimysium + perimysium + endomysium blend together to form the tendon that attaches muscle to bone
- **Myofibril** - Long, thread-like structures inside each muscle fiber

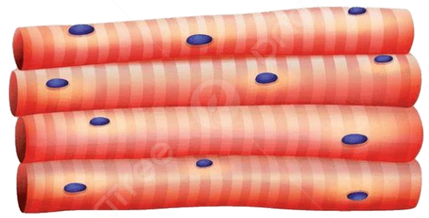


CLASSIFICATION

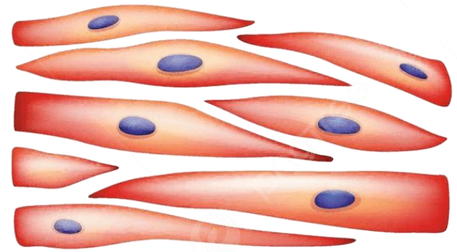


MUSCULAR TISSUES

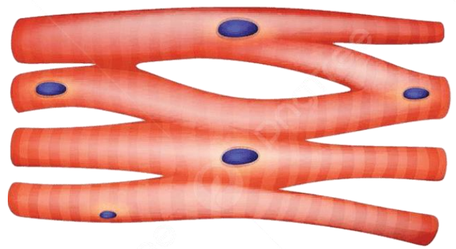
S.NO	SKELETAL MUSCLE	SMOOTH MUSCLE	CARDIAC MUSCLE
1	These are cylindrical	These are spindle shaped	These are cylindrical
2	Their ends are blunt	Their ends are tapering	Their ends are blunt
3	Fibers are unbranched	Fibers are unbranched	Fibers are branched
4	Fibers occur in bundles	Fibers occur singly, in sheets and small bundles	Fibers form three dimensional network
5	Blood supply is in abundance	Blood supply is poor	They are rich in blood supply



SKELETAL MUSCLE



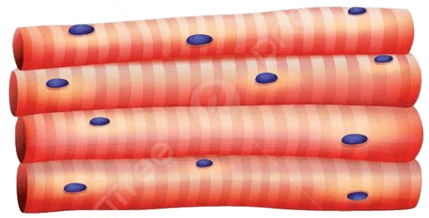
SMOOTH MUSCLE



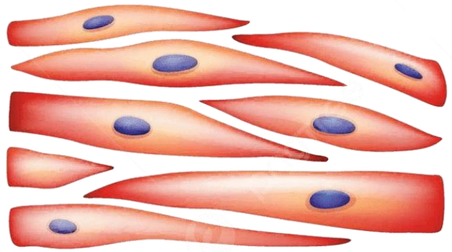
CARDIAC MUSCLE

MUSCULAR TISSUES

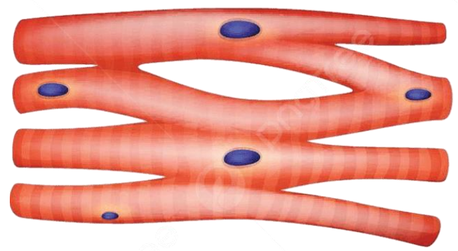
S.NO	SKELETAL MUSCLE	SMOOTH MUSCLE	CARDIAC MUSCLE
6	Voluntary	Involuntary	Involuntary
7	They are innervated by branches from cranial and spinal nerves	They are innervated by autonomic nervous system	They are innervated by autonomic nervous system
8	Intercalated disc is absent	Intercalated disc is absent	Intercalated disc is present
9	Fibers are multinucleated	Fibers are uninucleated	Fibers are uninucleated



SKELETAL MUSCLE



SMOOTH MUSCLE

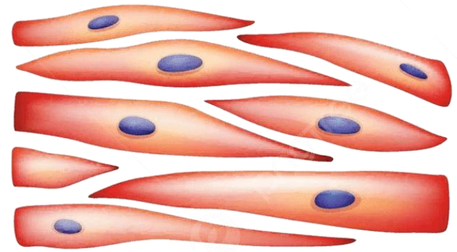


CARDIAC MUSCLE

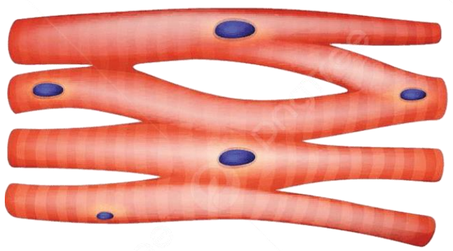
MUSCULAR TISSUES

S.NO	SKELETAL MUSCLE	SMOOTH MUSCLE	CARDIAC MUSCLE
10	Mitochondria are moderately abundant	Mitochondria are fewer	Mitochondria are abundant
11	Myoglobin is abundant	Myoglobin is poor	Myoglobin is abundant
12	Striations are conspicuous	Striations are absent	Striations are present but faint
13	They contract quickly	They contract slowly	They show rhythmic contractions
14	They easily get fatigued	They do not fatigue	They do not fatigue

SKELETAL MUSCLE



SMOOTH MUSCLE



CARDIAC MUSCLE

SUMMARY

- Muscular tissue is made for movement using actin-myosin proteins.
- **Main properties**: excitability, contractility, extensibility, elasticity.
- **Functions**: move body, maintain posture, produce heat, pump blood, push substances in organs.
- **Structure**: muscle fiber → endomysium → fascicle → perimysium → whole muscle → epimysium → tendon.
- **Three types**: Skeletal (voluntary, striated, fatigues), Smooth (involuntary, non-striated, no fatigue), Cardiac (involuntary, striated with intercalated discs, rhythmic).

REFERENCE

Books

- Waugh, A., & Grant, A. (2018). *Ross and Wilson Anatomy and Physiology in Health and Illness* (13th ed.). Elsevier.
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Websites

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THANK YOU