Al- Mustaqbal College University

Department Of Medical Instrumentation

Techniques Engineering

Anatomy and physiology

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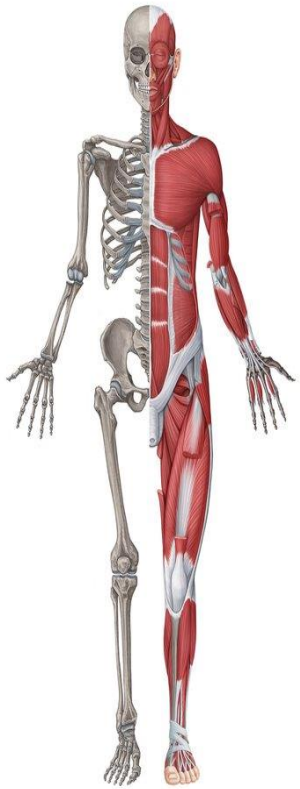
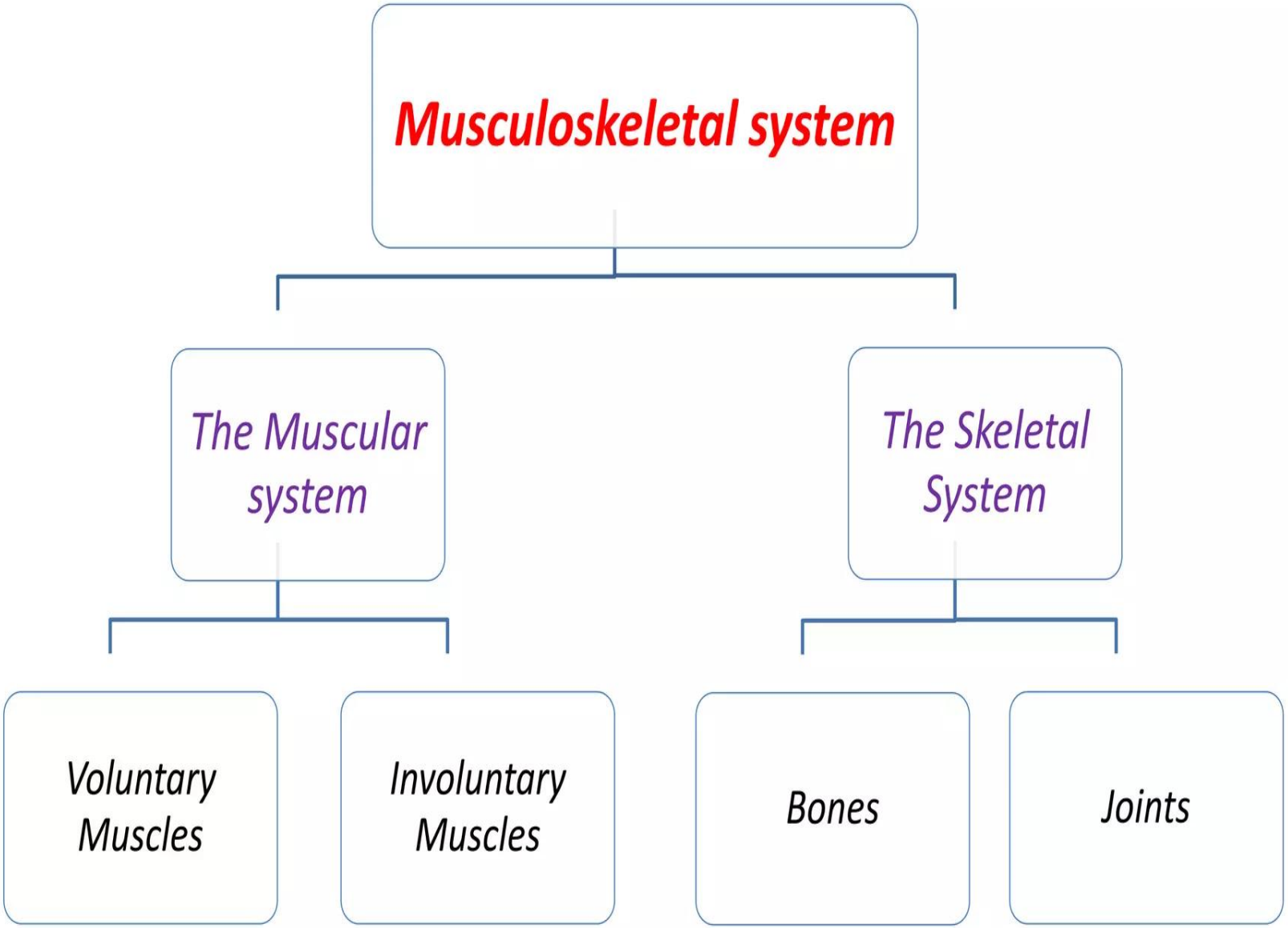
Musculoskeletal system



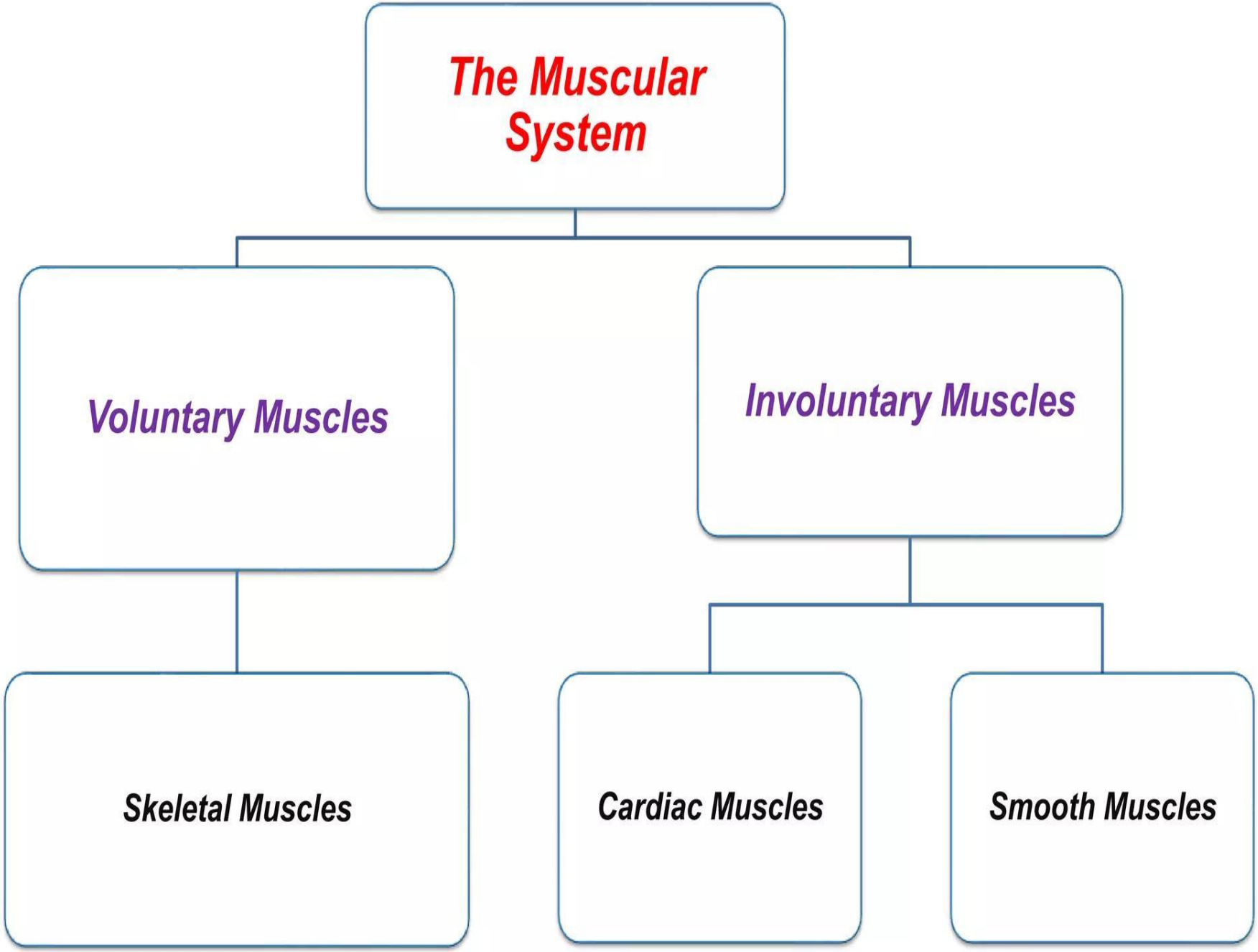
Musculoskeletal system

- The *musculoskeletal system* is made up of the body's bones (the skeleton), muscles, cartilage, tendons, ligaments, joints, and other connective tissue that supports and binds tissues and organs together.
- This system provides form, support, stability & movement to the body
- It comprises of Muscular System and the Skeletal System


Musculoskeletal system
The Muscular system
The Skeletal System
Voluntary Muscles
Involuntary Muscles
Bones
Joints

Functions of Muscular system

- Locomotion
- Movement
- Posture formation and its maintenance
- Assistance in blood circulation and respiration
- Protection and support to the viscera
- Production of strength by converting chemical energy to mechanical energy.
- Contribution to the functions of digestion, defecation, urination and the process of child birth.
- External expression of emotions


The Muscular System
Voluntary Muscles
Involuntary Muscles
Skeletal Muscles
Cardiac Muscles
Smooth Muscles

Muscle:

a band or bundle of fibrous tissue in a human or animal body that has the ability to contract, producing movement in or maintaining the position of parts of the body.

Classification of muscles

on the basis of structure and function

Smooth muscles

1.Maintain flow of fluids along tissue walls.

2.Fatigue slowly.

3.Found in lungs, stomach,oesophagus and intestines.

Cardiac muscles

1.Controlled by central nervous system and "Pacemaker" cells.

2.Donot fatigue.

3.Found only in heart and tips of blood vessels.

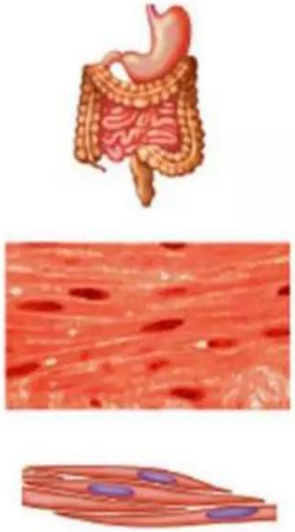
Skeletal muscles

1.Aid in voluntary movement.

2.Fatigue more rapidly than other muscles.

3.attached to skeleton.

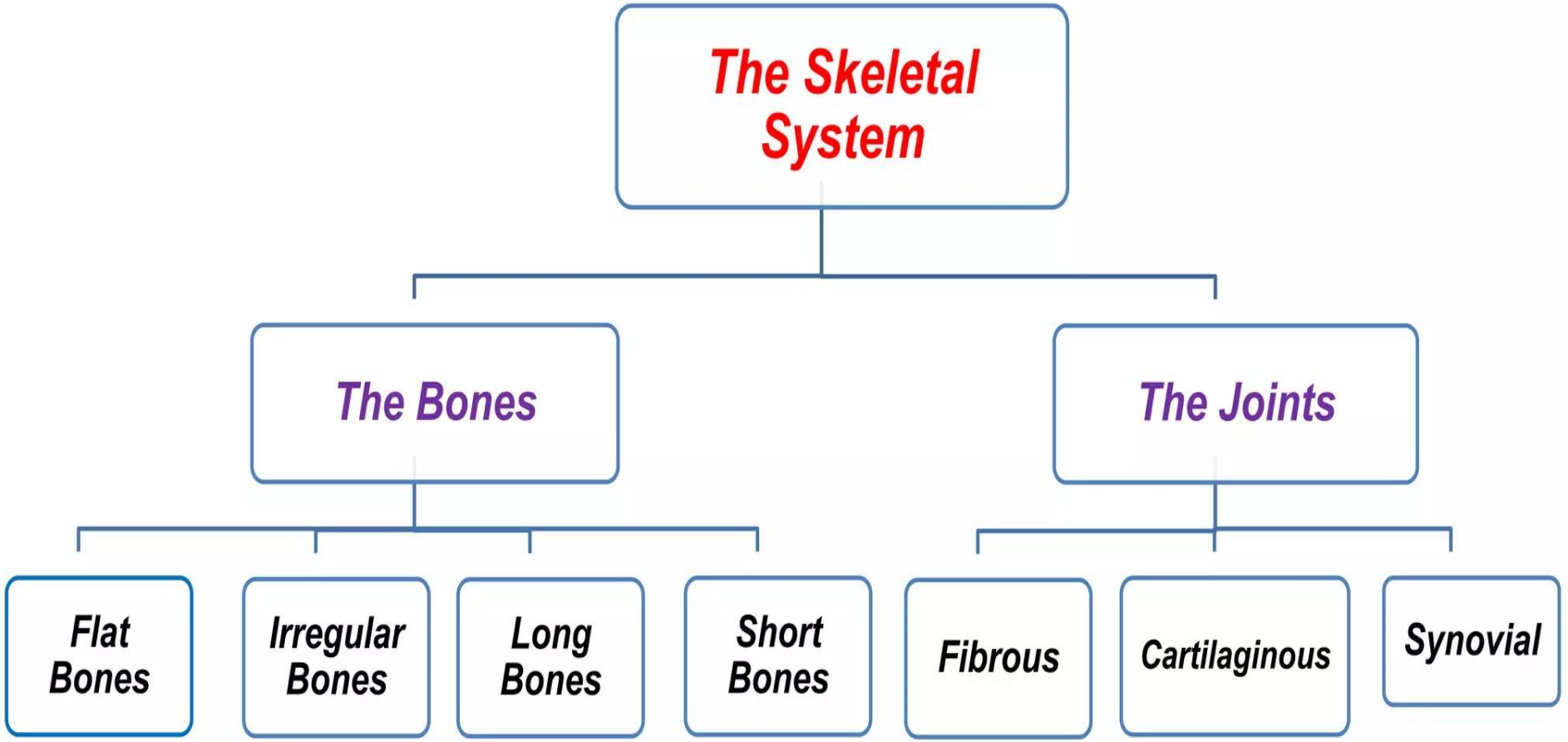
Classification of muscles



Smooth muscle
- has spindle-shaped, nonstriated uninucleated fibers.
- occurs in walls of internal organs.
- is involuntary.

Cardiac muscle
- has striated, branched, uninucleated fibers.
- occurs in walls of heart.
- is involuntary.

Skeletal muscle
- has striated, tubular, multinucleated fibers.
- is usually attached to skeleton.
- is voluntary.

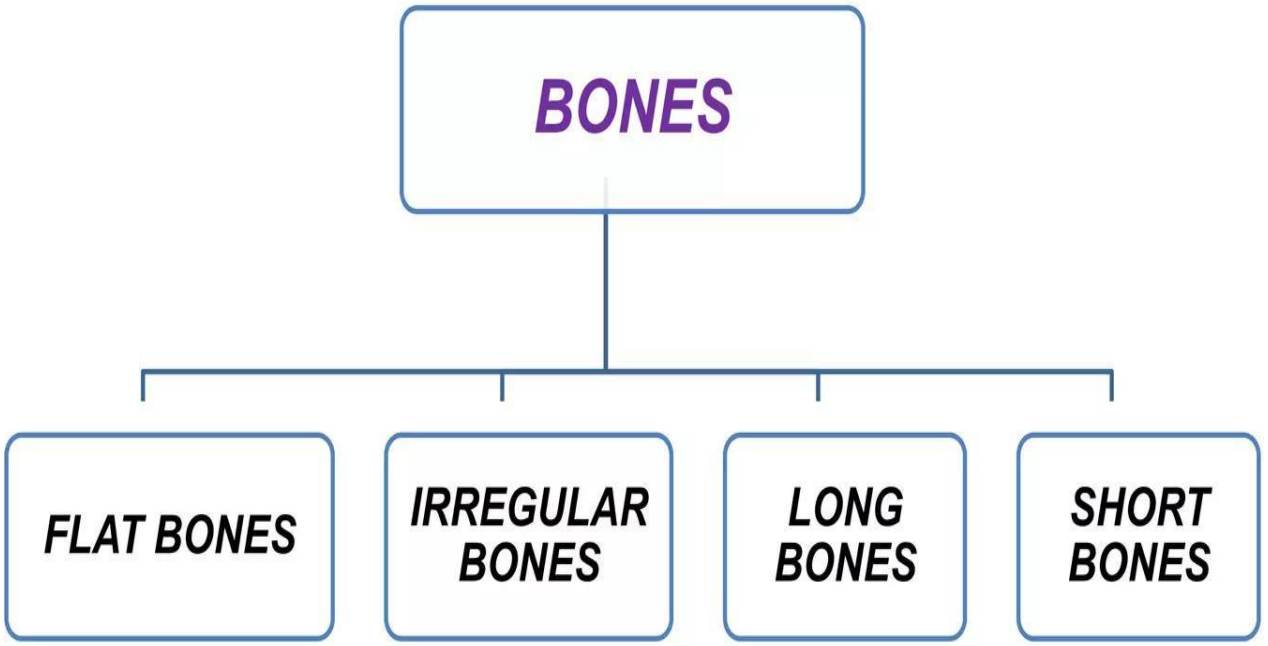

The Skeletal System
The Bones
The Joints
Flat Bones
Irregular Bones
Long Bones
Short Bones
Fibrous
Cartilaginous
Synovial

The Skeletal System

- Forms framework of the body.
- Bone is the hardest part of the body.
- No. of bones in adult human body =206
- Total weight of skeletal system = 15% of total body weight.
- The skeletal system =Bones + Joints.

The bones

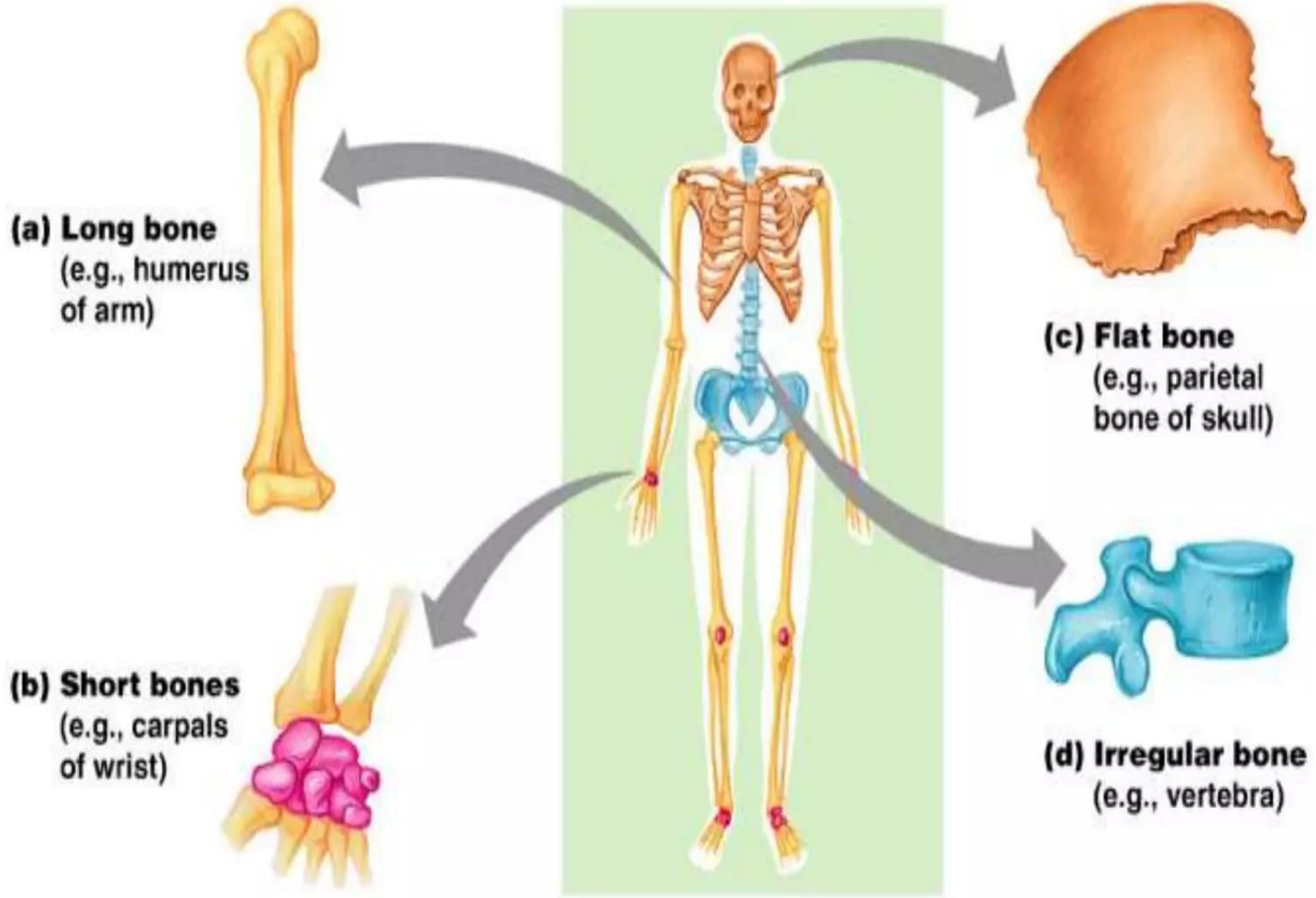
- Each bone is supplied by nerves, blood vessels & lymphatic vessels.
- Composition of bone - Calcium & Phosphorus.
- Bone Marrow - Soft core of the bone . Blood cells are produced in the marrow.
- Cartilage - Softer than bone . e.g. Ear lobe ,nose .


BONES
FLAT BONES
IRREGULAR BONES
LONG BONES
SHORT BONES

Classification of bones

Flat bone	Irregular bone	Long bone	Short bone
1.They are thin like plate. 2.They protect organs as they cover them. 3.Cranial bones of the skull, Sternum, Ribs & Scapulae	1.Complex and irregular in shape 2.Example: Vertebrae	1.Length is greater than the width 2.Slightly curved for better strength 3.Bones of hands and thighs	1.Cubical in shape 2.Equal in length & width. 3.Bones of wrist & ankles

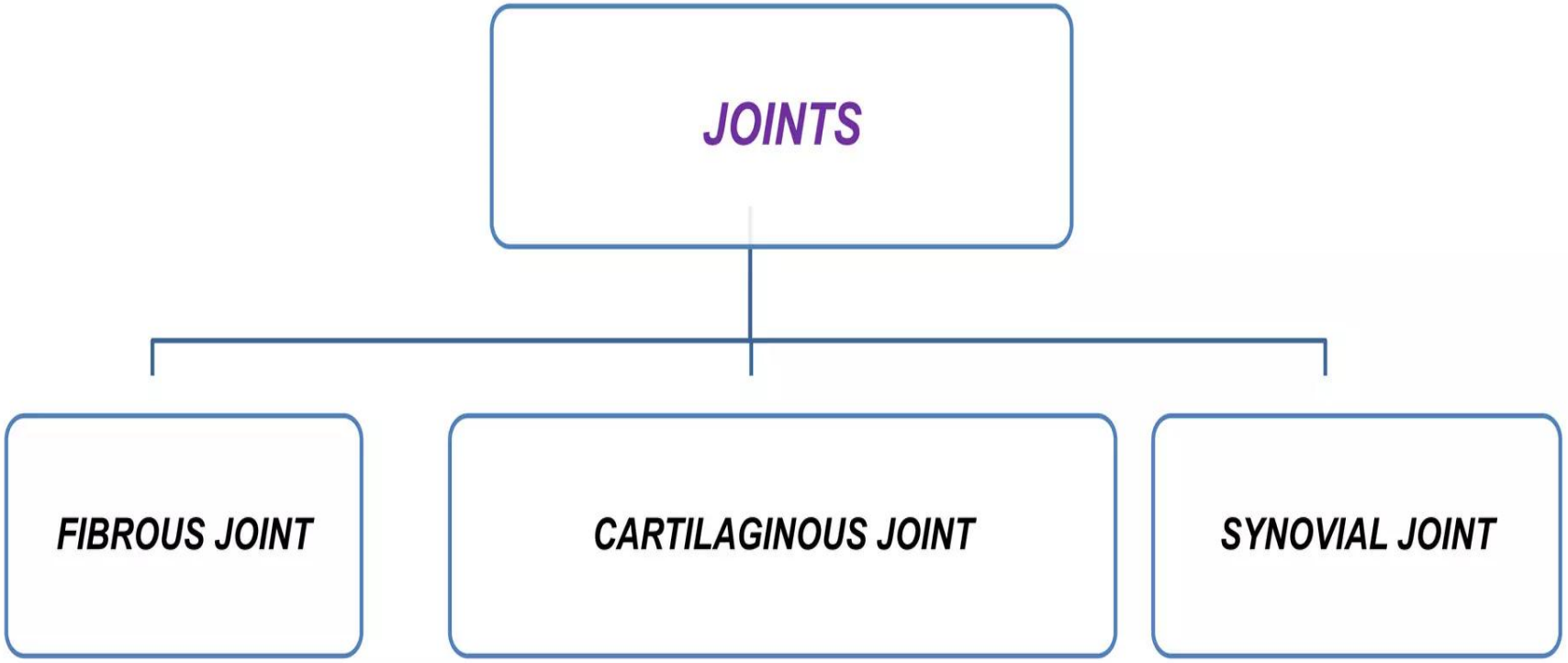
Classification of bones



Joints

- A point where two bones or bone and a cartilage contact each other is called Joint or an Articulation.
- Two bones are held together by a flexible connective tissue
- Most of the joints permit the movement within particular limit.
- While some joints restrict the movement.

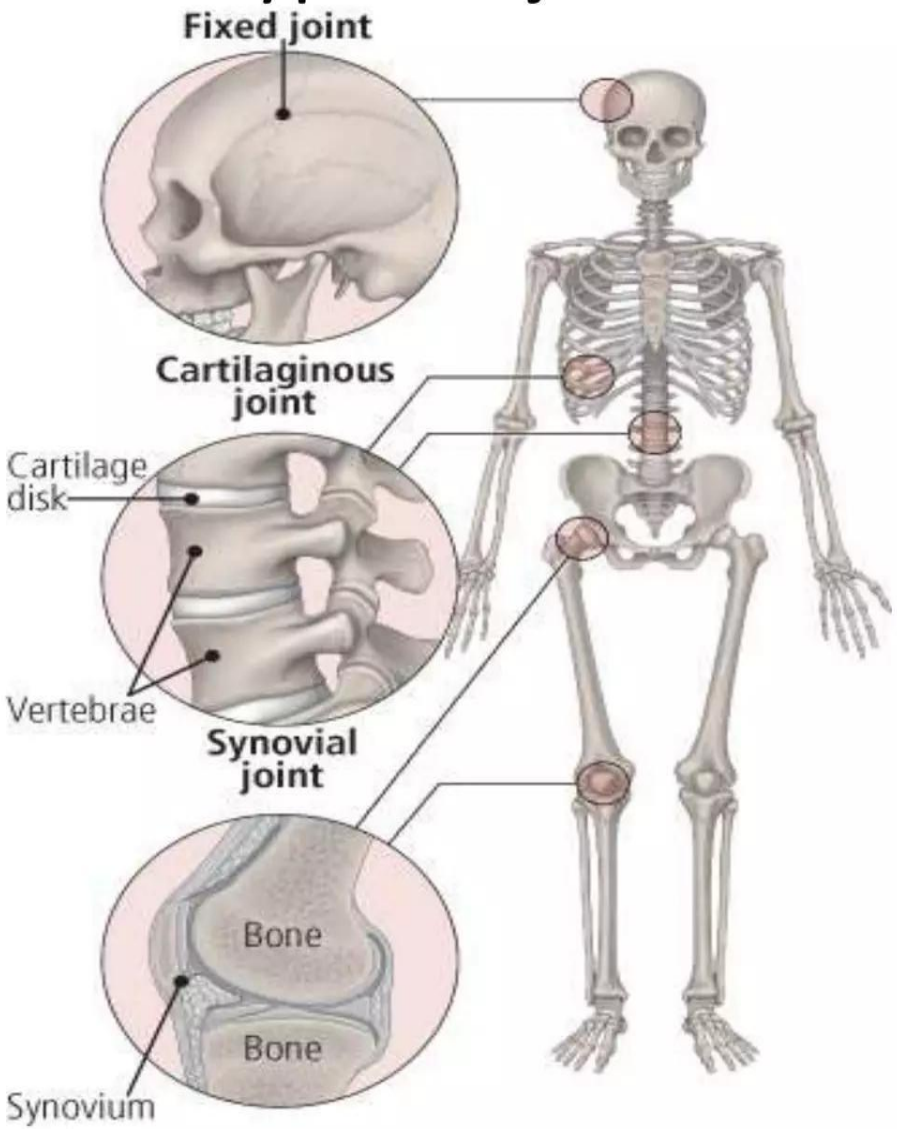
Classification of joints



Types of joints

Fibrous joints	Cartilaginous joints	Synovial joints
1.The articulating bones are held very close to each other by a fibrous connective tissue. 2.Very limited movement is possible or there is no movement at all. 3.Joints between shafts of the ulna & radius or tibia and fibula, Joint of the skull.	1.The joining material is cartilaginous tissue. 2.Immovable in nature. 3.Joint between first rib and the sternum. 4.Portion of intervertebral disc is cartilaginous. 5.Vertebral joints are slightly movable.	1.Joints of the bones move freely upon each other. 2.Synovial cavity – space between two articulating bones 3.Sleeve like articular capsule, covers the joint. 4.The outer fibrous layer of the capsule prevents dislocation. 5.The inner membrane secrets synovial fluid, lubricating & nourishing the joint

Types of joints



Functions of skeletal system

1) Forms framework of the body & gives to the shape to the body .
2) Protection of vital organs
3) Movement - mobility & stability.
4) Production of R.B.C.
5) Calcium metabolism

Thank you