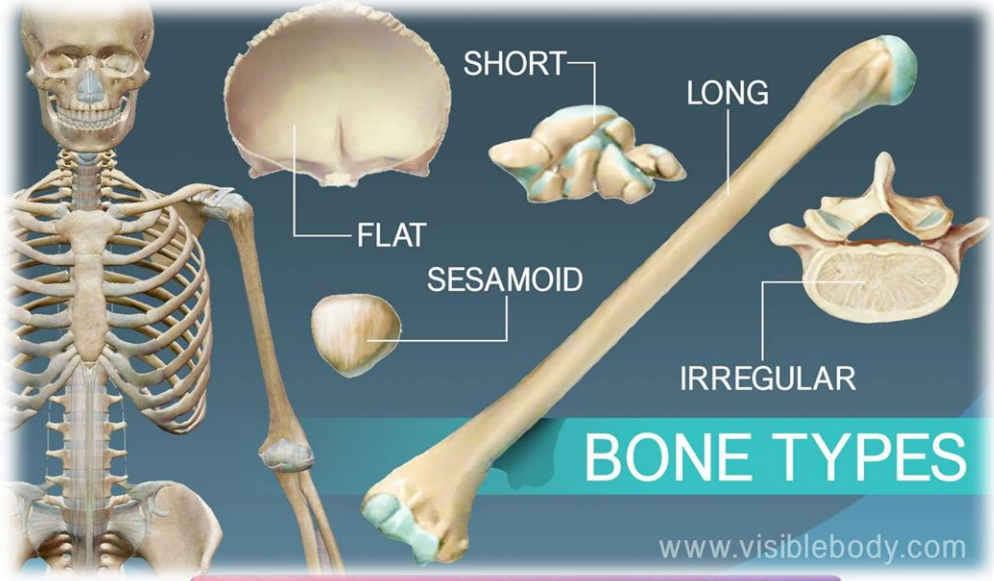
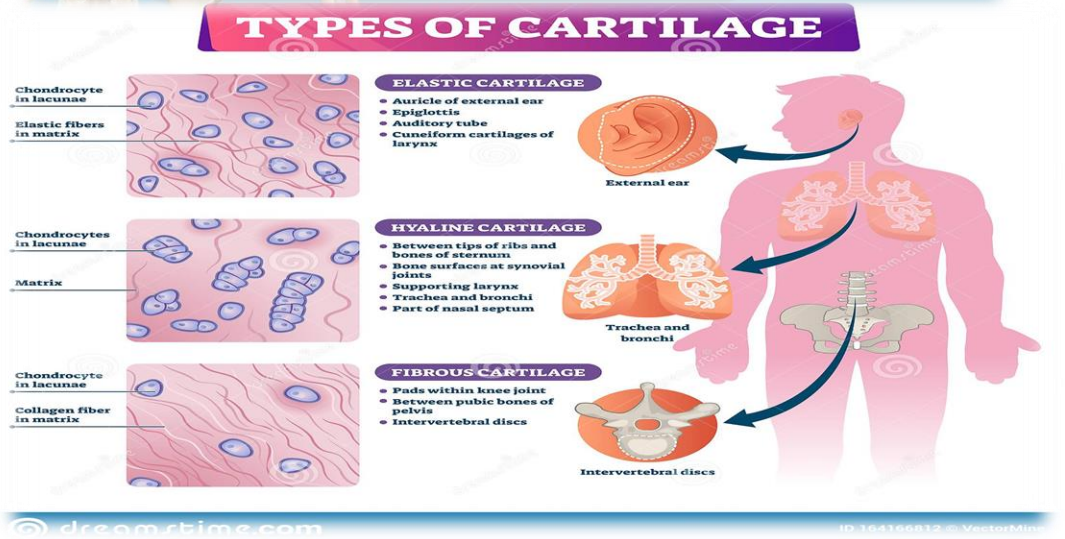
Human Anatomy -1st year 2020-2021





Basic Anatomical Structures

3. Bones And Cartilages

Lecture (6)

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Objective learning

*What is bone
*The types of the bone
*What is Surface marking of the bone.
*What is cartilages
*The types of the cartilages.

What is bones?

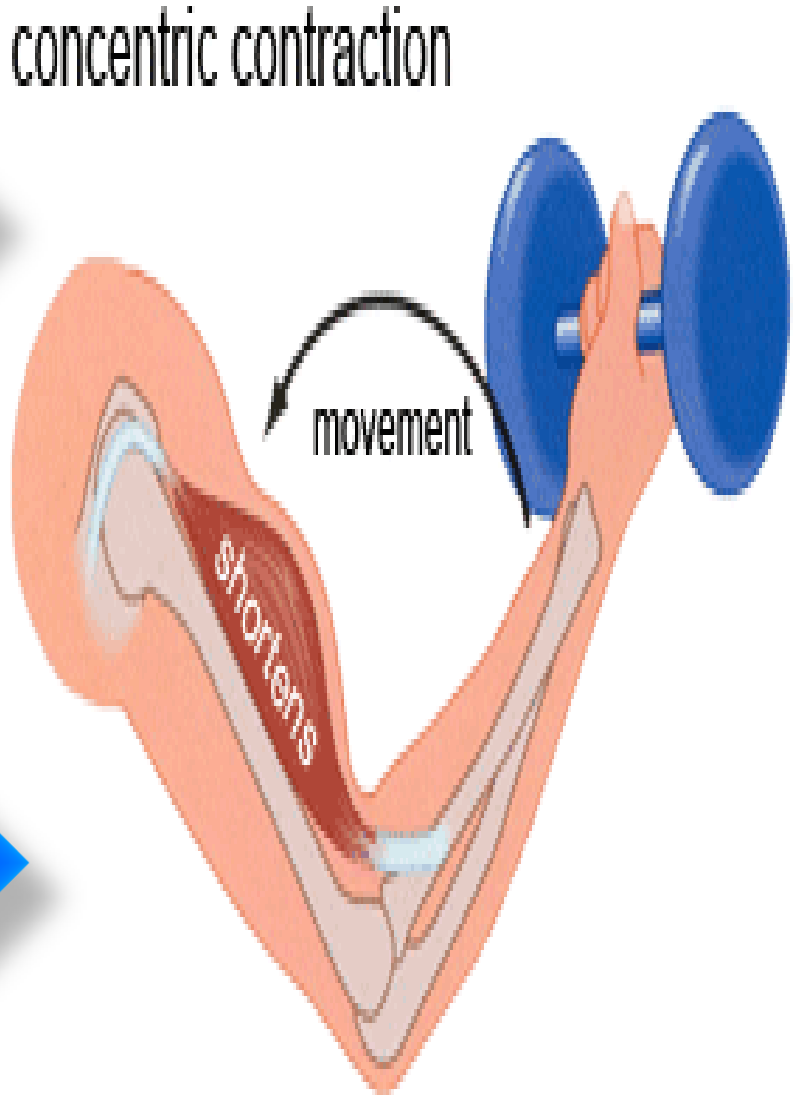
Bones are rigid organs that form a part of the endoskeleton of vertebrates. The extra cellular matrix of bone contains collagen and minerals. The mineral components give the compression strength to the bone.

What are the functions of bones ?

1. **Support** : Forms the frame work that support the body

What are the functions of bones ?

2- Provides points of attachment for skeletal muscles.



3.Movement :
When muscles contract, they pull on bones.

What are the functions of bones ?

4.Protection

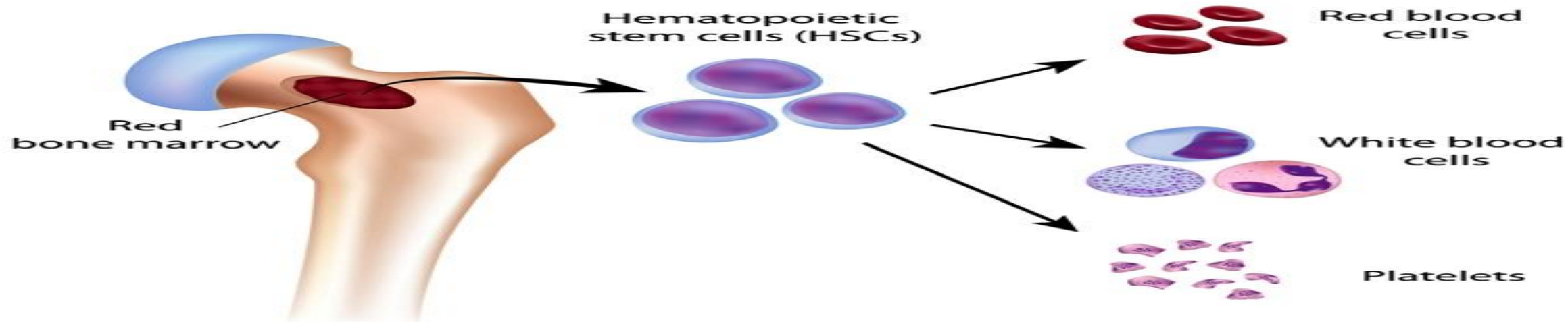
Protects the organs within the body cavities against mechanical injury, e.g. the rib cage protects the heart and lungs, the skull protects the brain

What are the functions of bones ?

6. Provides a storage site for inorganic salts such as calcium and phosphate and fatty acid

What are the functions of bones ?

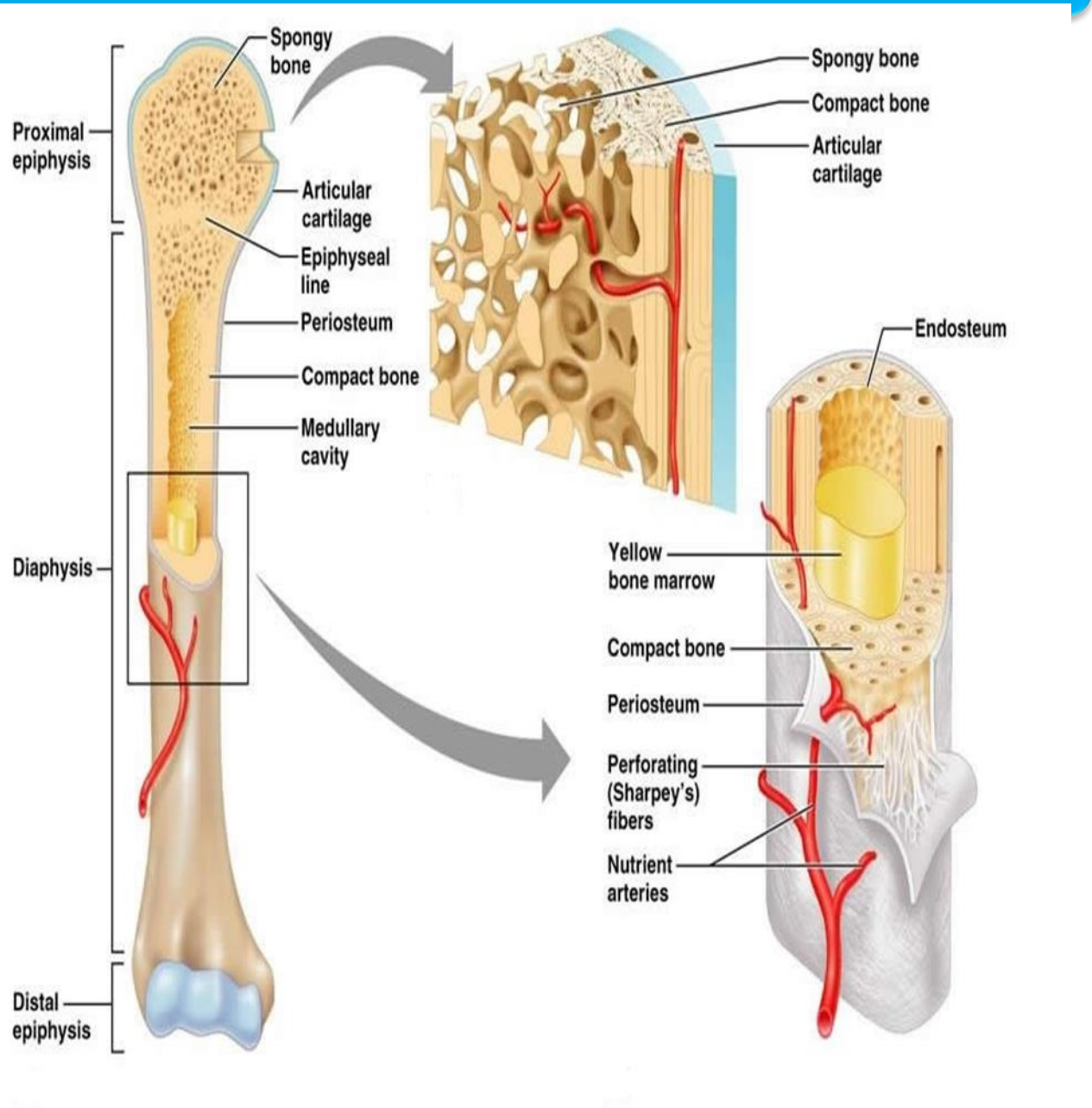
5. Contains and protects the red bone marrow, where red blood cells (or erythrocytes), white blood cells (or leukocytes) and lymph cells are formed



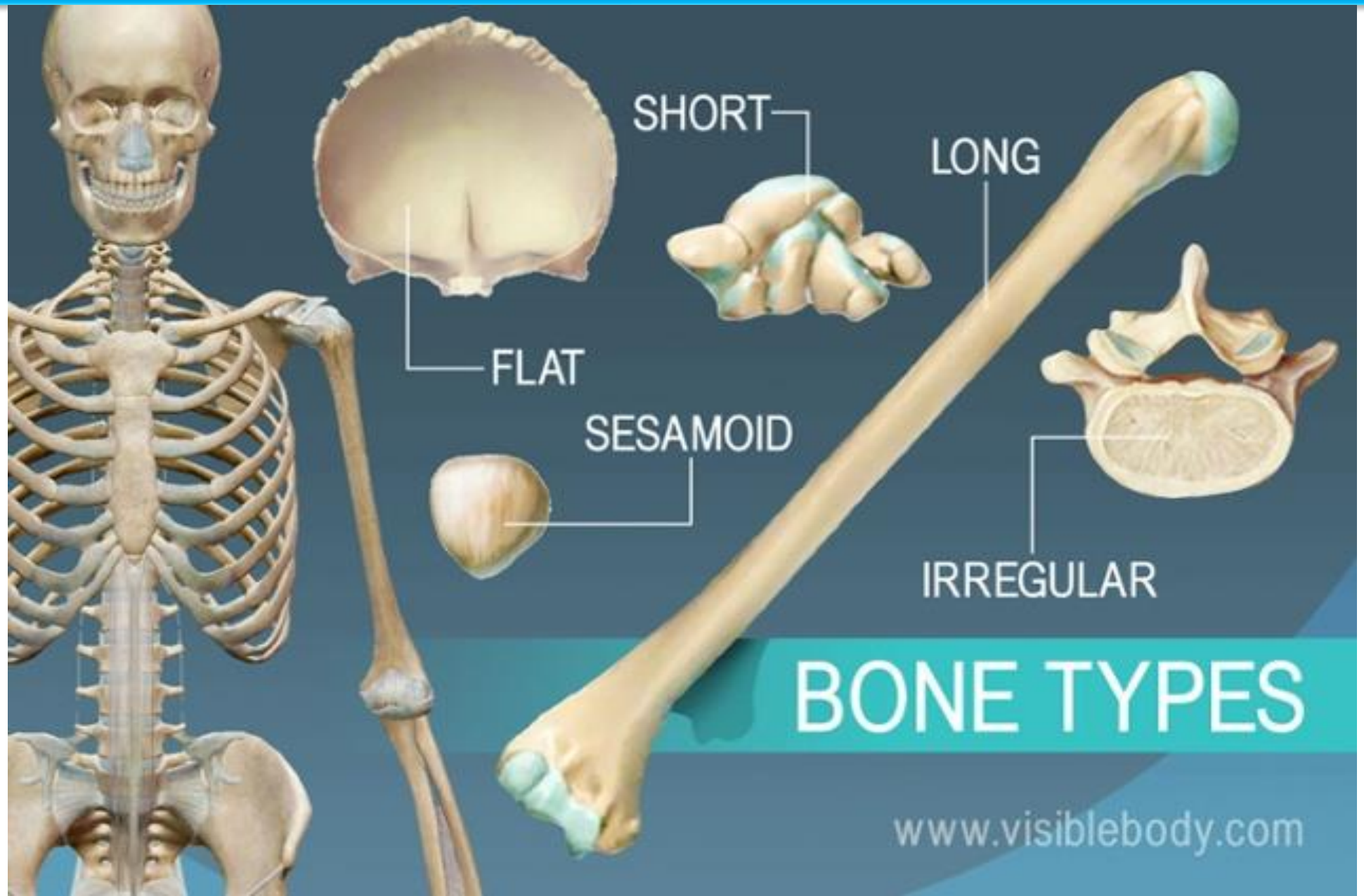
Compact and spongy bones

Compact bone : The hard outer layer of bones is composed of compact bone tissue, so-called due to its minimal gaps and spaces.

Spongy bone : Inside the interior of the bone is the trabecular bone tissue, that is also called cancellous or spongy bone.

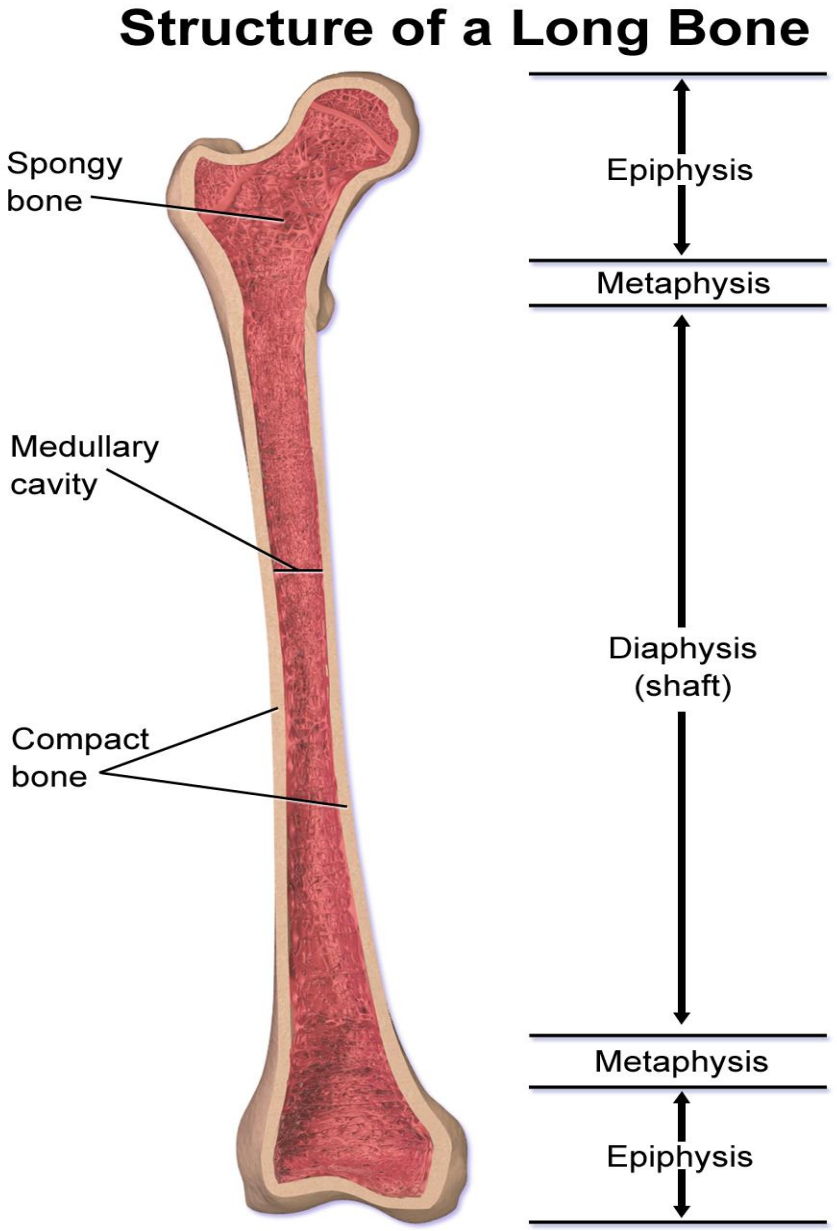


Types Of Bones



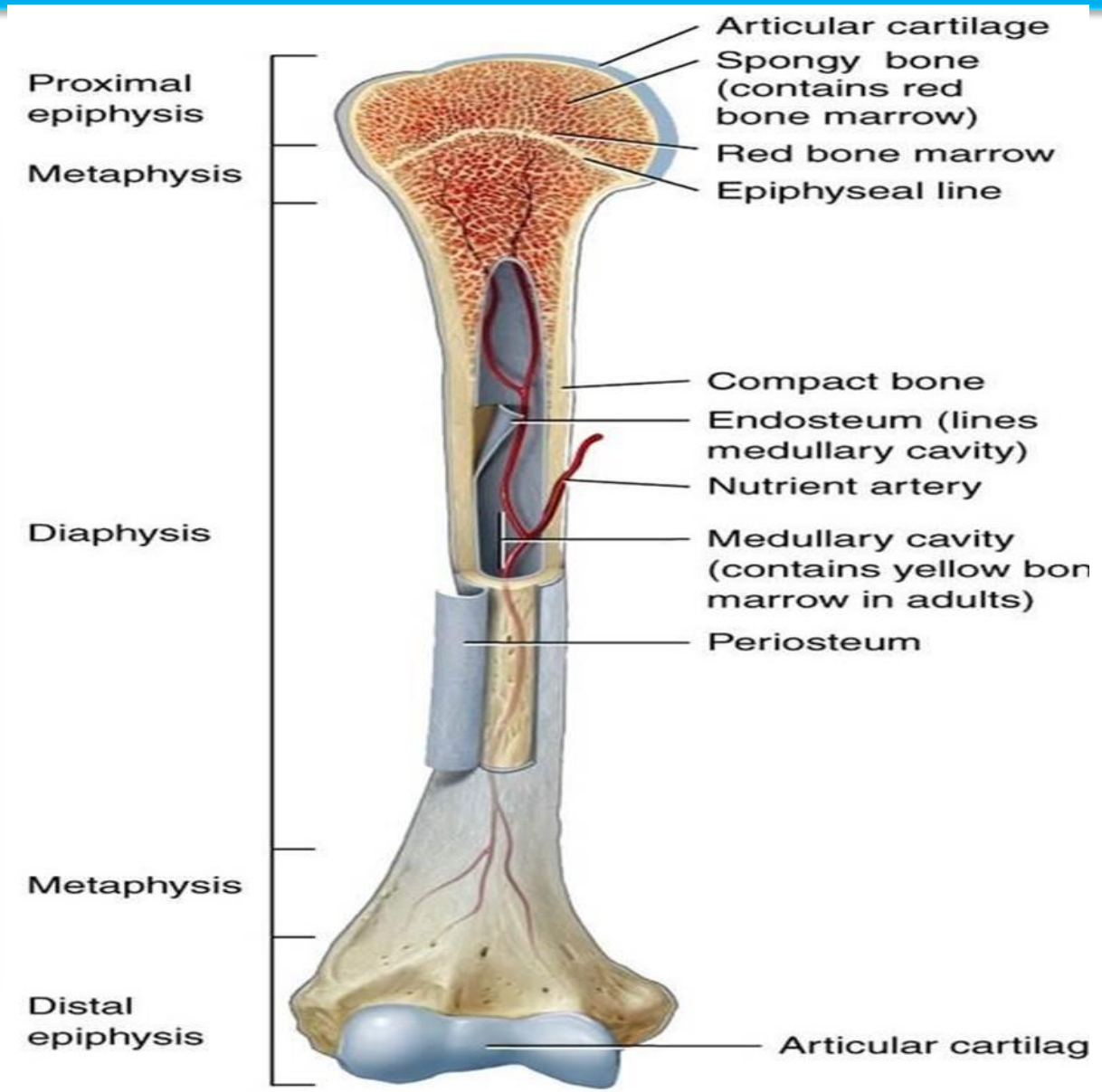
Long Bones

Long bones are longer than they are wide. They can be divided into three regions - epiphysis, metaphysis and the diaphysis.



1.Long Bone

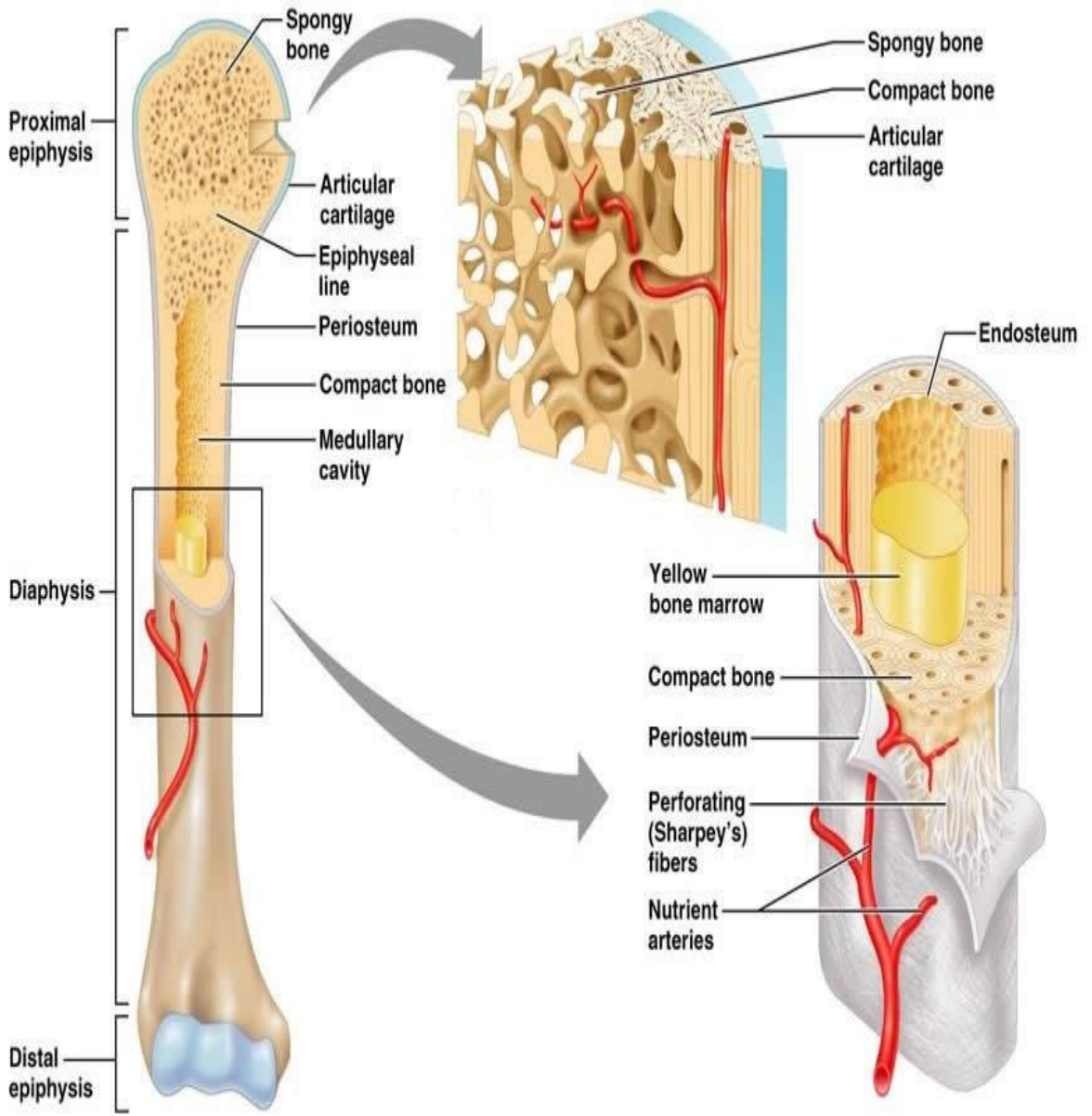
- The ends of the long bone is the epiphysis and the shaft is the diaphysis..
- The metaphysis contains the epiphyseal plate, which is responsible for elongating and lengthening the bone during the growth of the human via a process called endochondrial ossification.



(a) Partially sectioned humerus (arm bone)

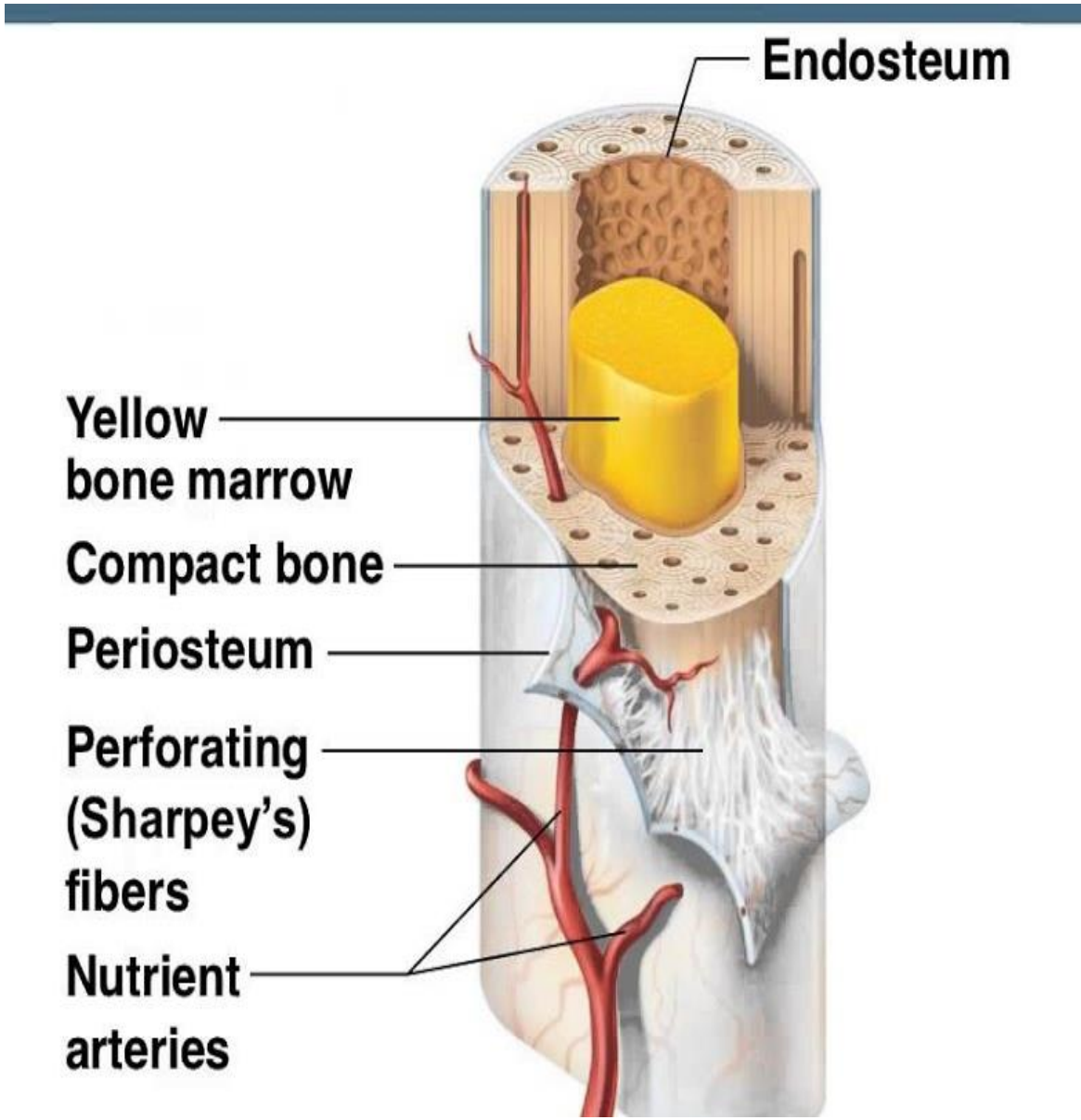
Long Bone

The outside of the flat bone consists of a layer of connective tissue called the **periosteum.**
The interior part of the long bone is the medullary cavity
The medullary cavity, also known as the **marrow cavity** where red bone marrow and/or yellow bone marrow (adipose tissue) is stored.



Long bone

- **Endosteum:** A thin vascular membrane of connective tissue that lines the surface of the bone tissue that forms the medullary cavity of long bones.
- **Epiphyseal plate:** A hyaline cartilage plate in the metaphysis, located at each end of a long bone where growth occurs in children and adolescents.



2.Short bone

It is cube-like in shape, being approximately equal in length, width, and thickness. The only short bones in the human skeleton are in the carpals of the wrists and the tarsals of the ankles.
It consisted of a thin layer of compact bone surrounding a spongy bone .

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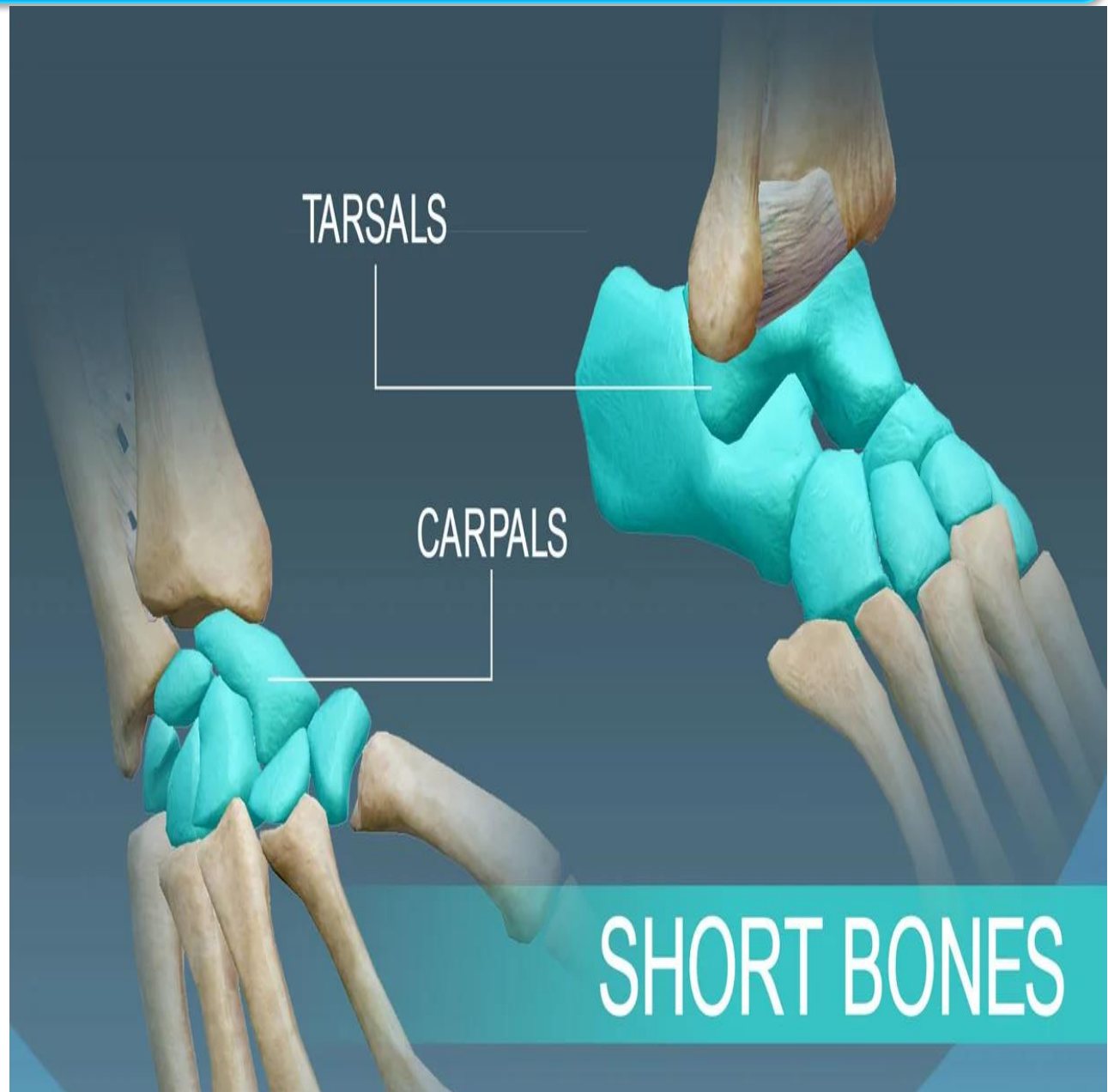


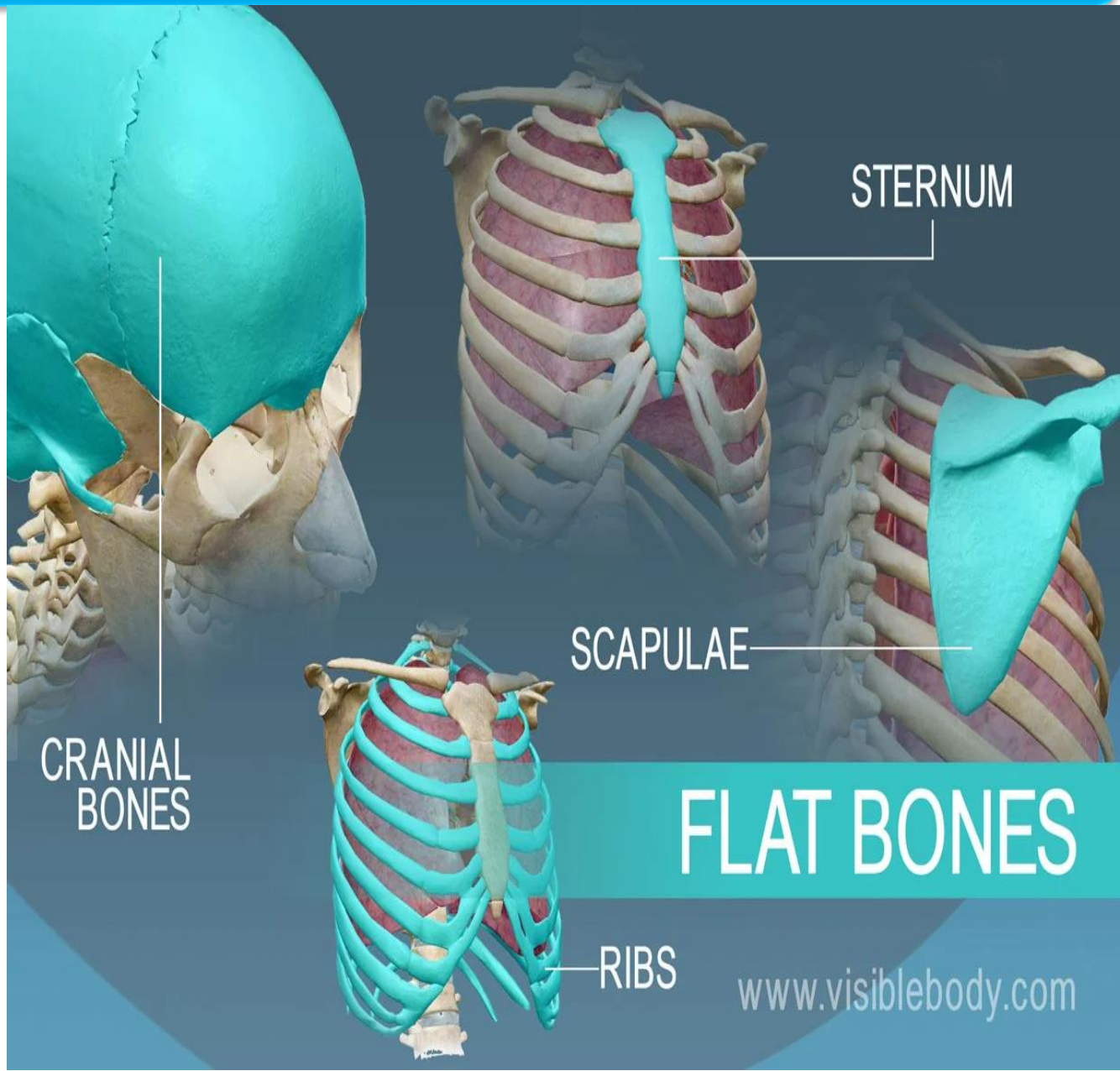
3. Flat Bone

IS Thin ,curved ,two parallel layers of compact bones sandwiching in between a layer of spongy bone.

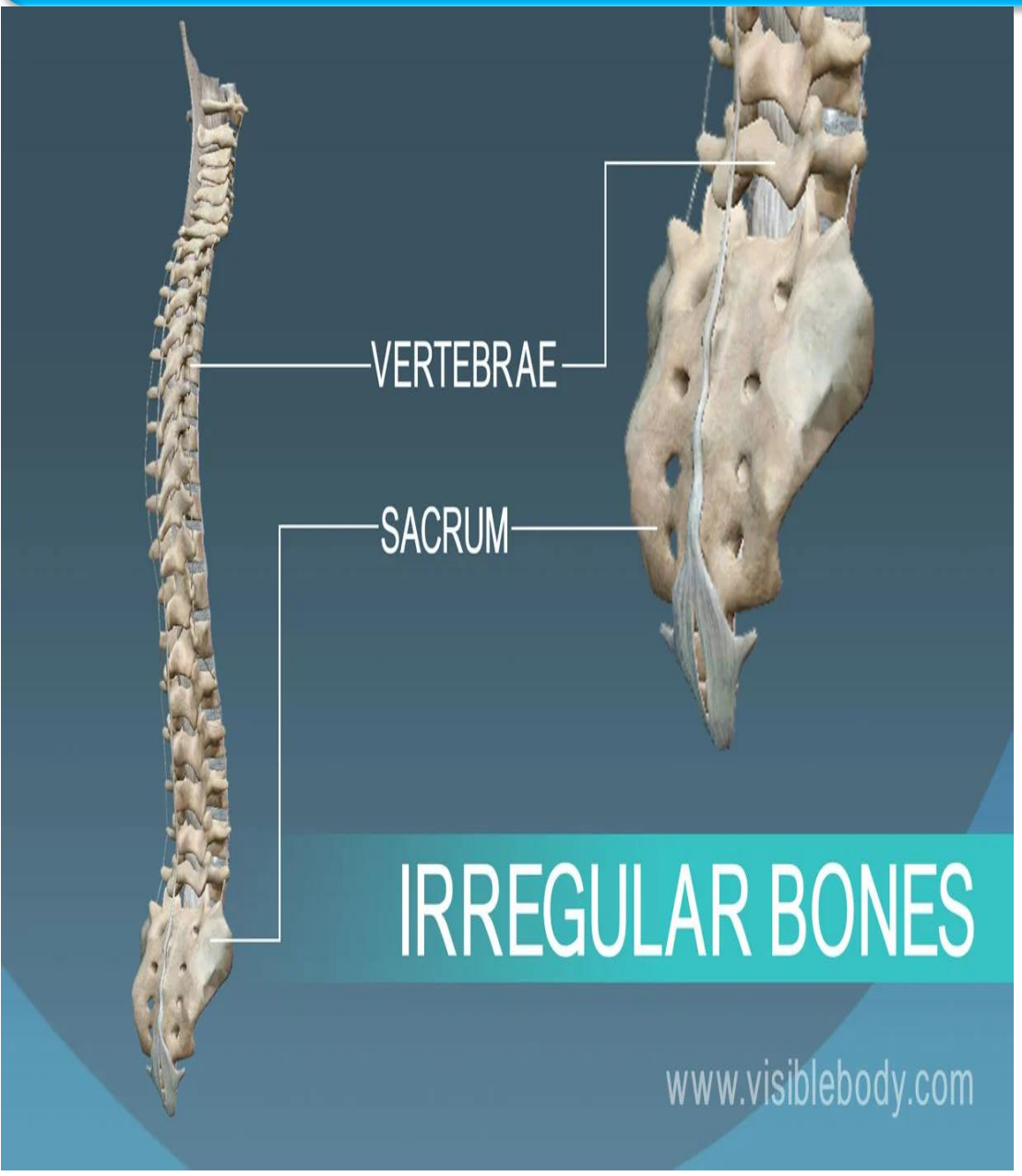
e.g.

*Most of the bones of the skull

*sternum.



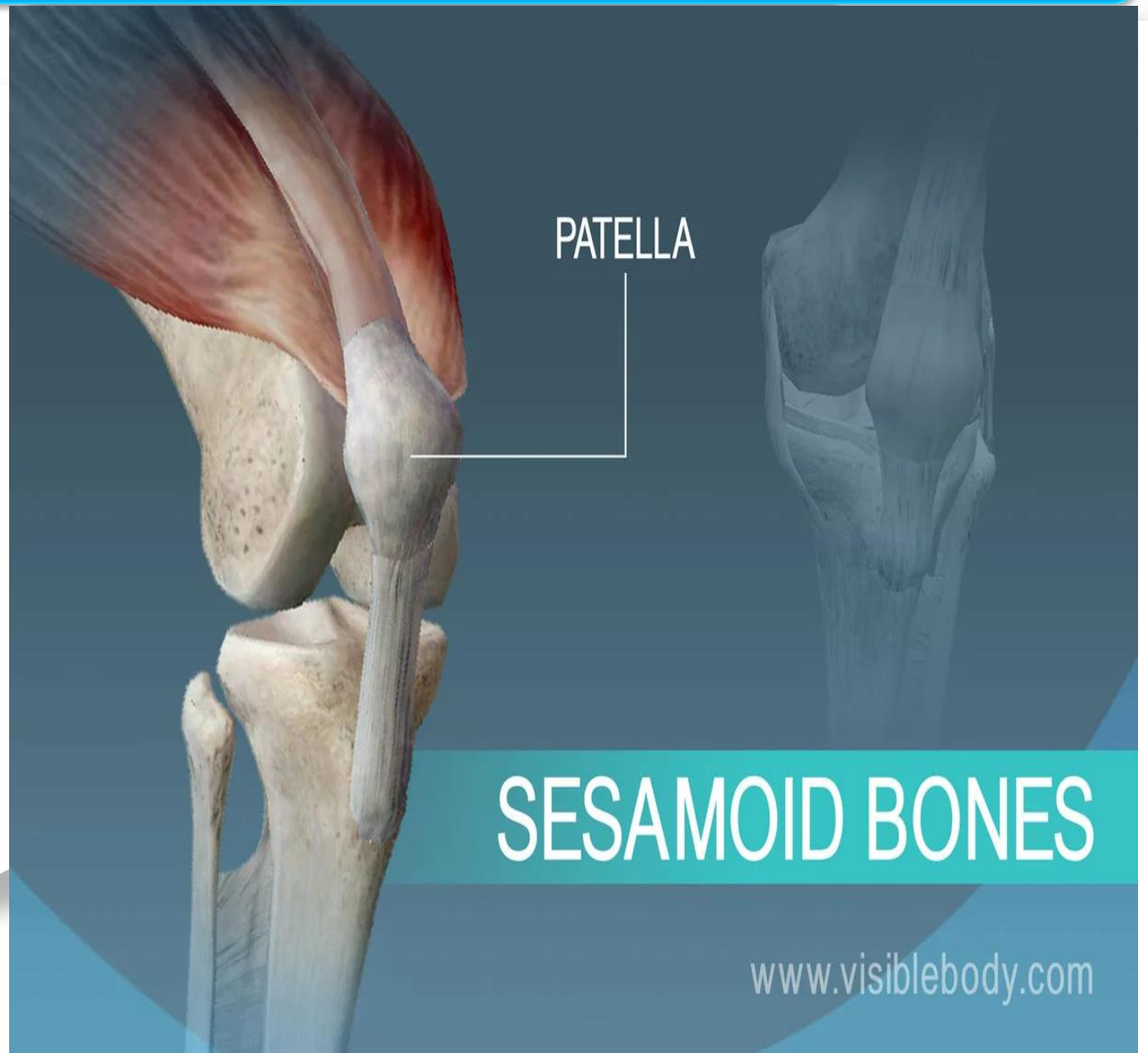
3. Irregular Bone



Thin layers of compact bone surrounding a spongy bone .
Irregular shape and complicated.
e.g. vertebrae , hip bone, sacrum

3. Sesamoid Bone

- It is Bone embedded in tendons.
- Act to hold the tendon further away from joint
- Examples of sesamoid bones are the patella
- the pisiform.



Surface marking

The surface of bone is rough and irregular due to attachment of fascia, tendons, ligaments, aponeurosis and muscles. This roughening is not present at birth .The pulling effect of these structures raised the periosteum of new bone deposited under it.

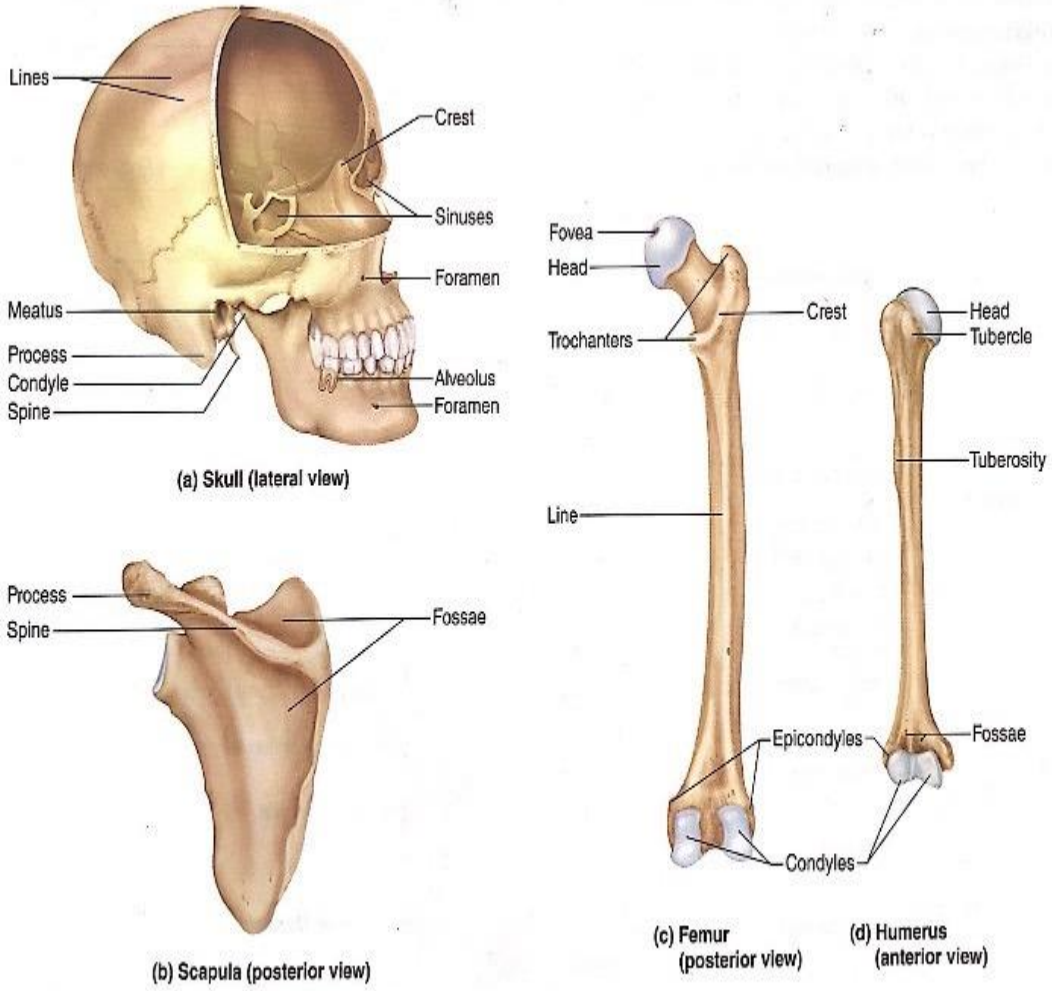


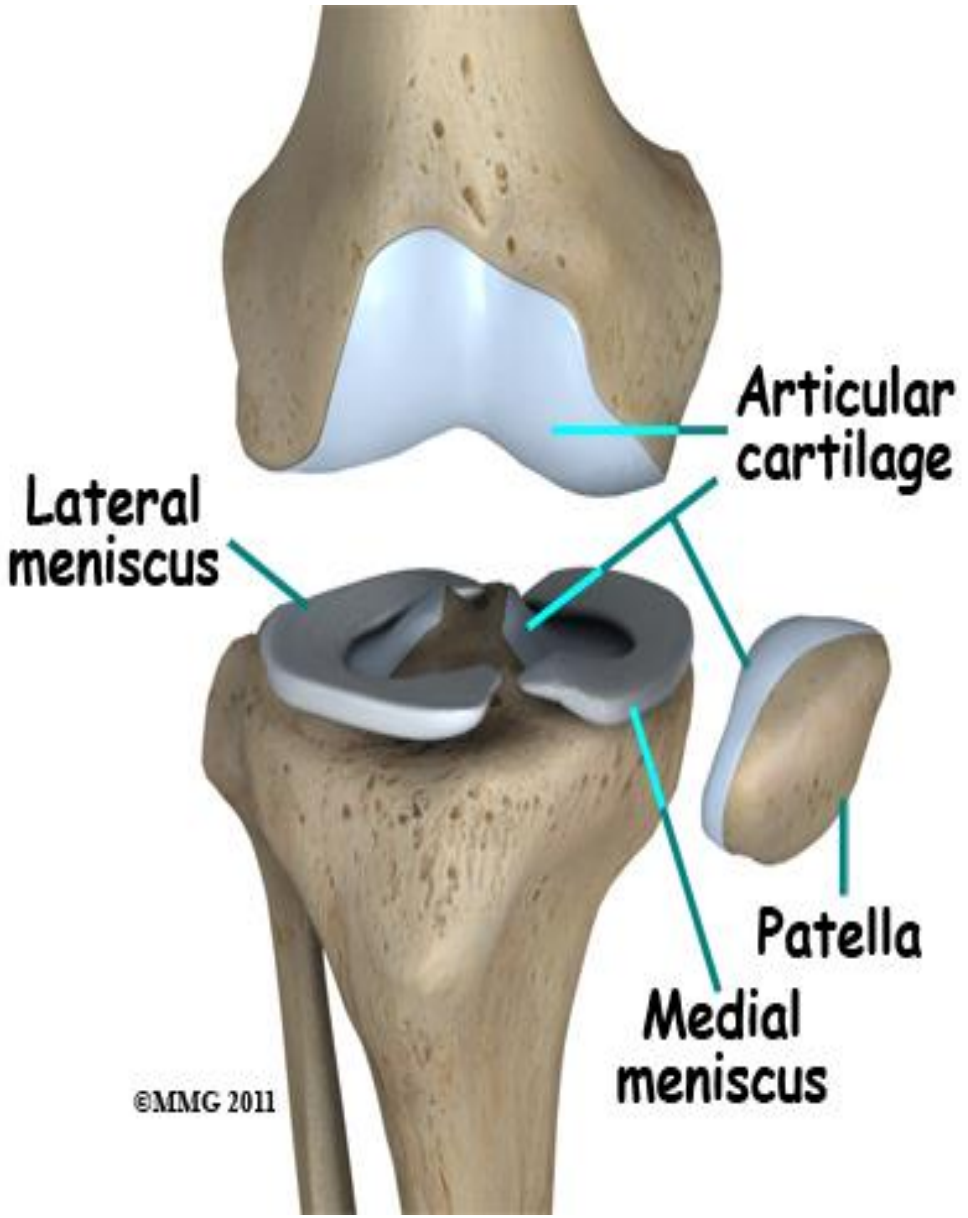
Figure 7.2 Anatomical Features of Bones. Most of these also occur on many other bones of the body.

The Cartilage

Is a type of connective tissue .It is found in costal cartilage of ribs ,respiratory tract ,covers the ends of the bone, growth plates of bone ,inter vertebral disc,, and external ear.

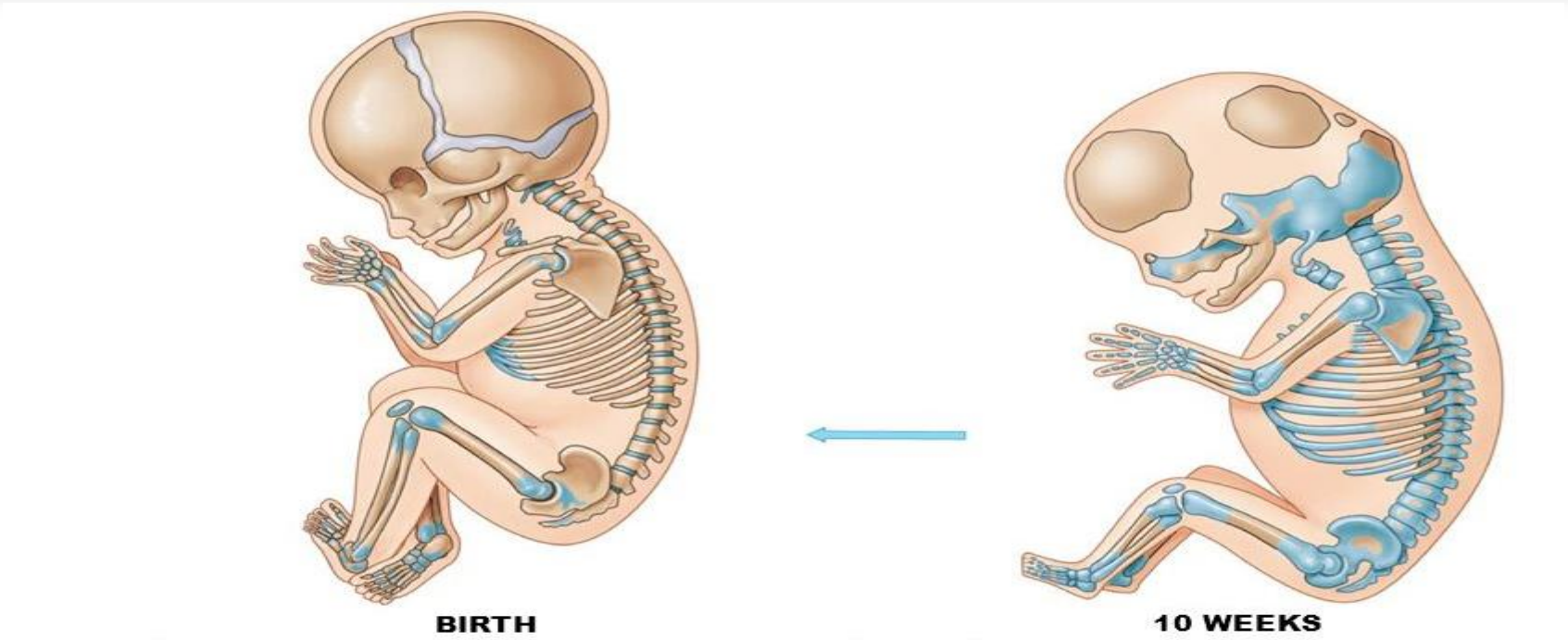
Function of the cartilages

1-➲ provide support and form smooth for Jthe oints



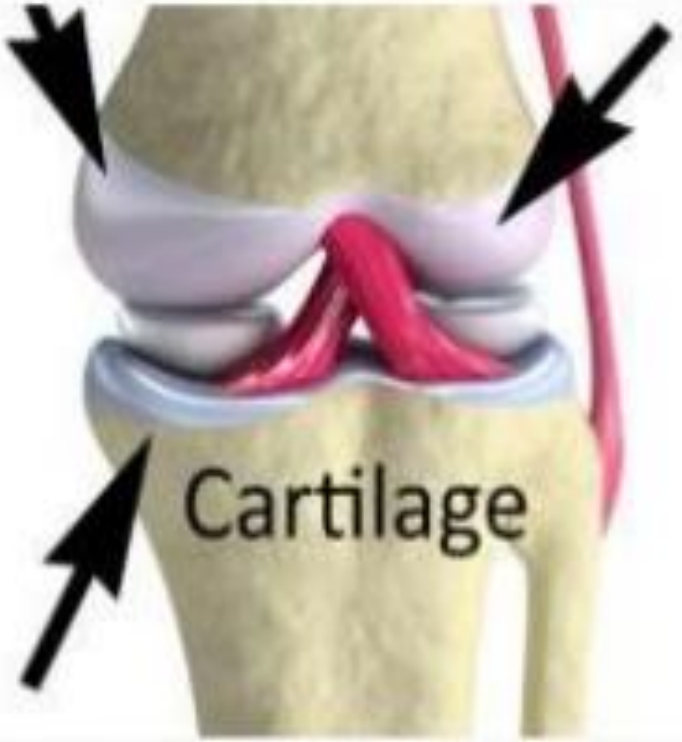
Function of the Cartilages

2- ➲ *Form most of embryonic skeleton*



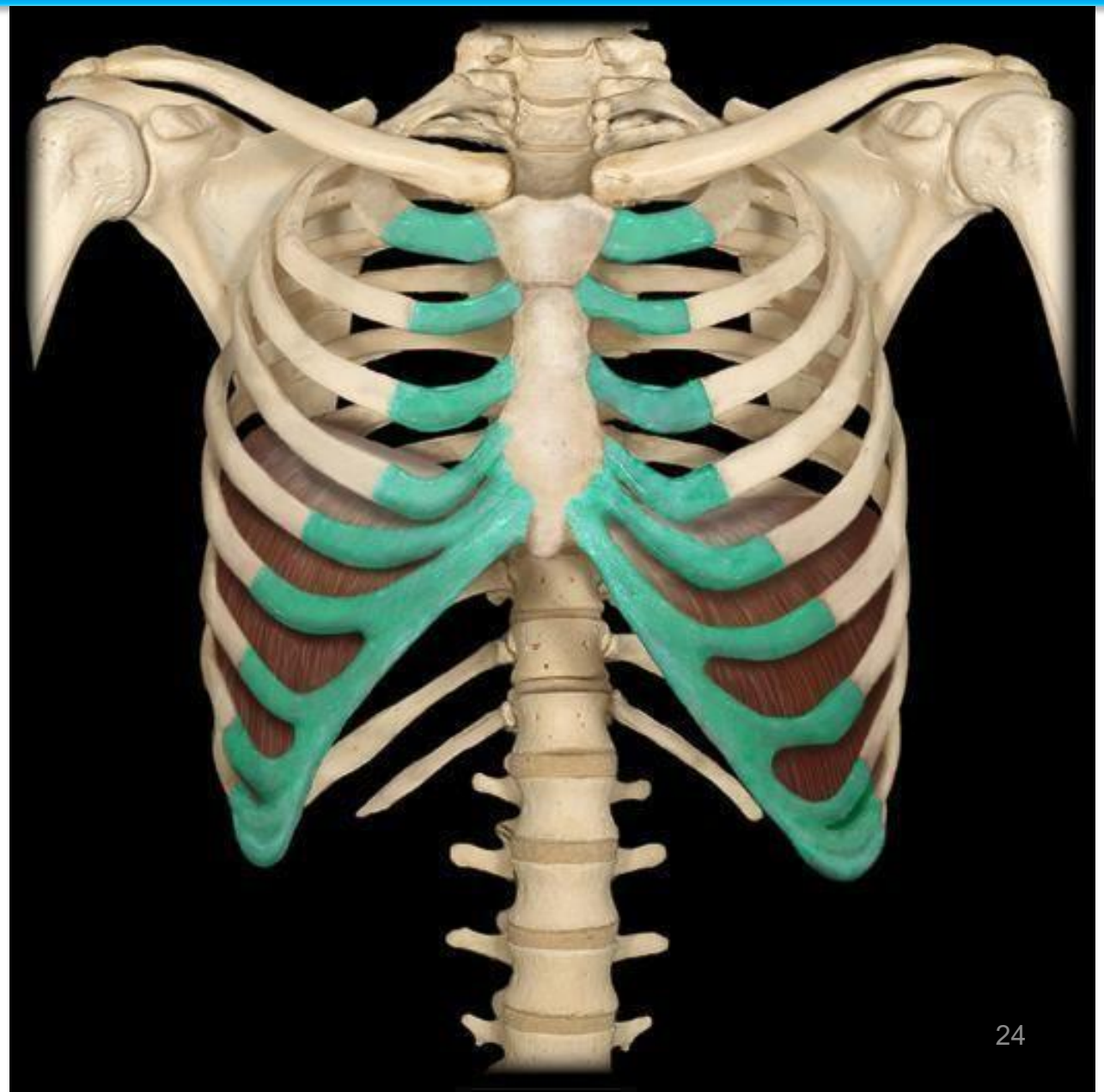
Function of the cartilages

3- ➲ *Withstand pressure*



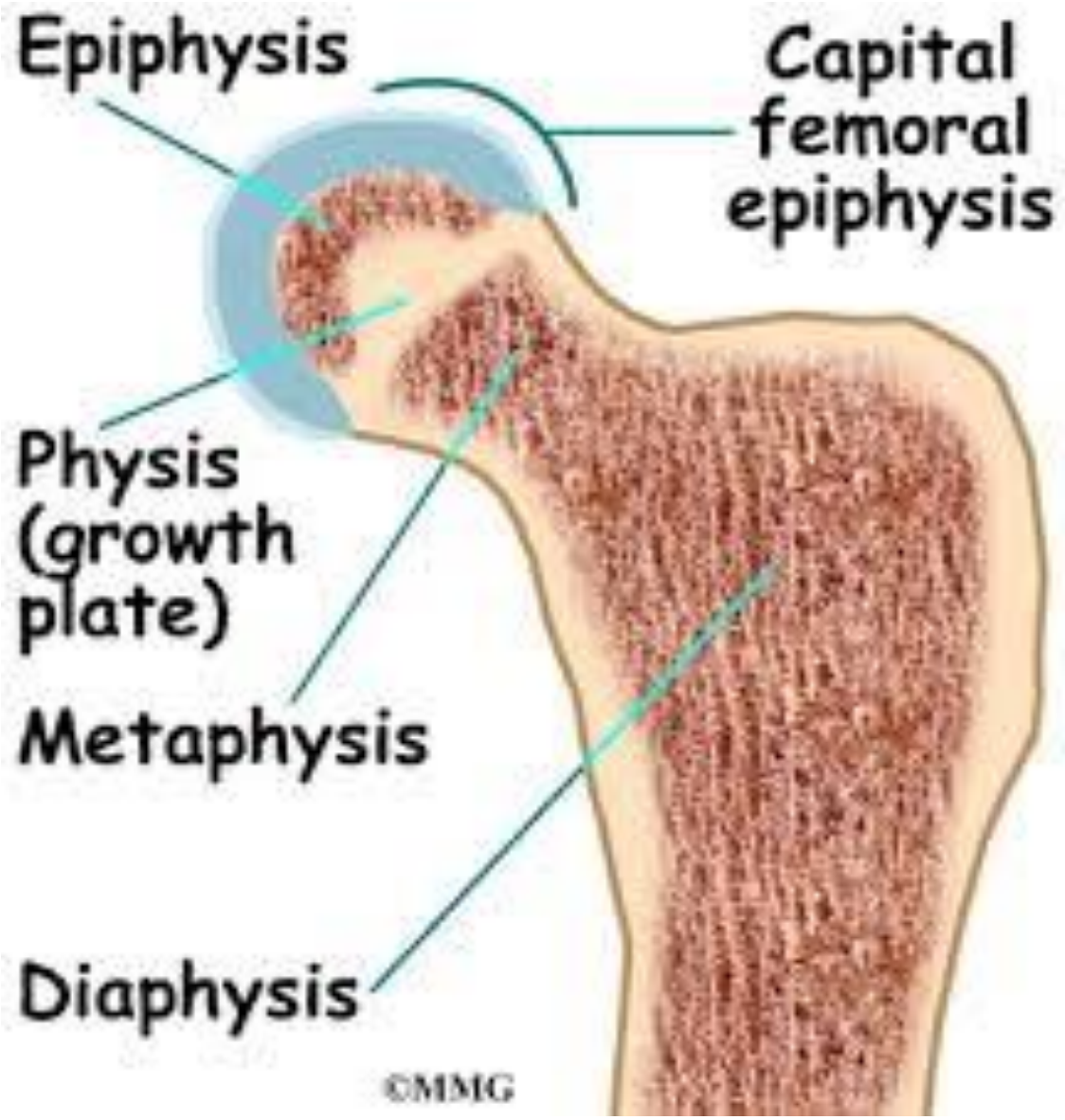
Function of the cartilages

4- ➲ Give elasticity of thoracic wall.



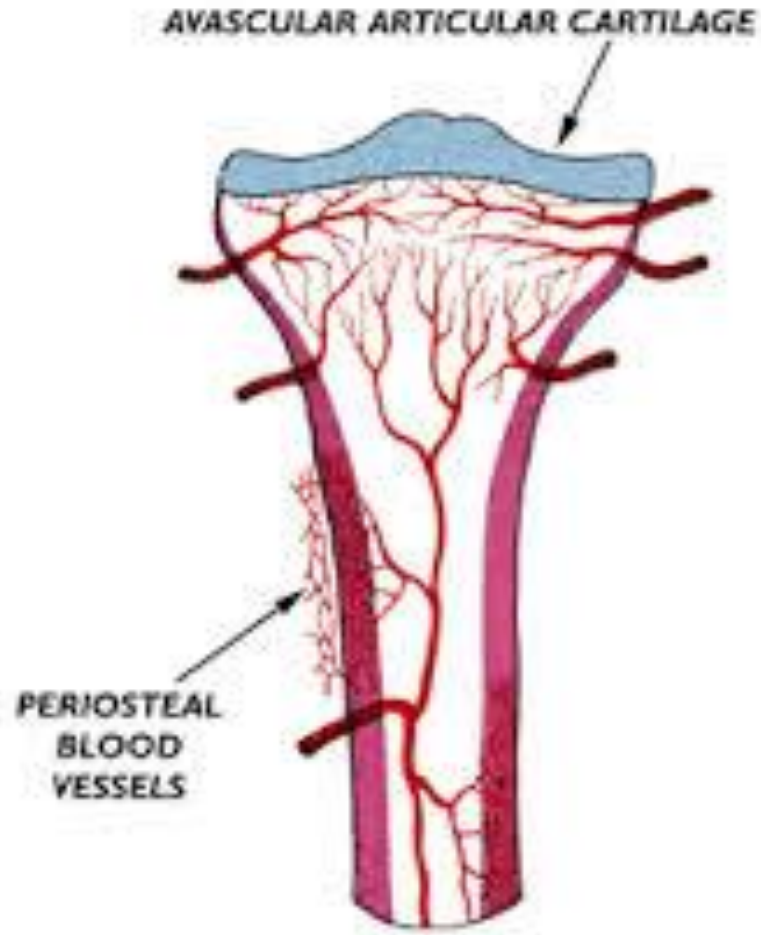
Function of the cartilages

5- ➲ *It is the Site of bone growth . (growing plate is cartilage)*

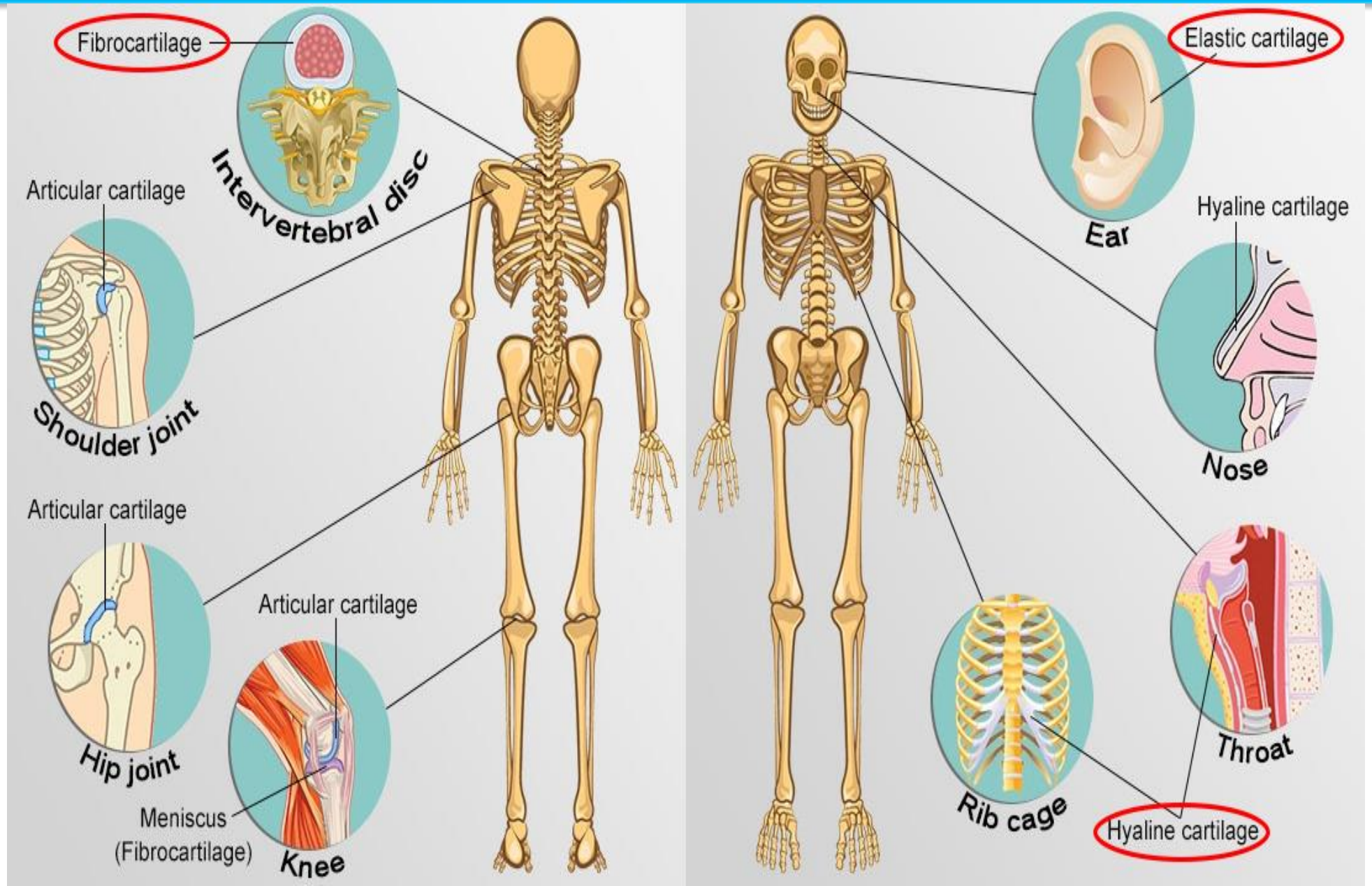


Clinical Note

*Cartilage heals slowly after injury because blood vessels don't penetrated.



Types of the cartilages



1.Hyaline Cartilage

Is the most abundant cartilage, contains collagen fiber in homogenous matrix, this gives it its glassy appearance. It covers the surface of bones at joints ,provides smooth surface ,that can withstand compression .It also form the costal cartilage, which attaches the ribs to the sternum; Bronchi; Bronchial Tubes; Larynx ,Nose; Trachea & Embryonic skeleton (i.e. in the fetus). It provides smooth surfaces, flexibility and support.

1.Hyaline Cartilage

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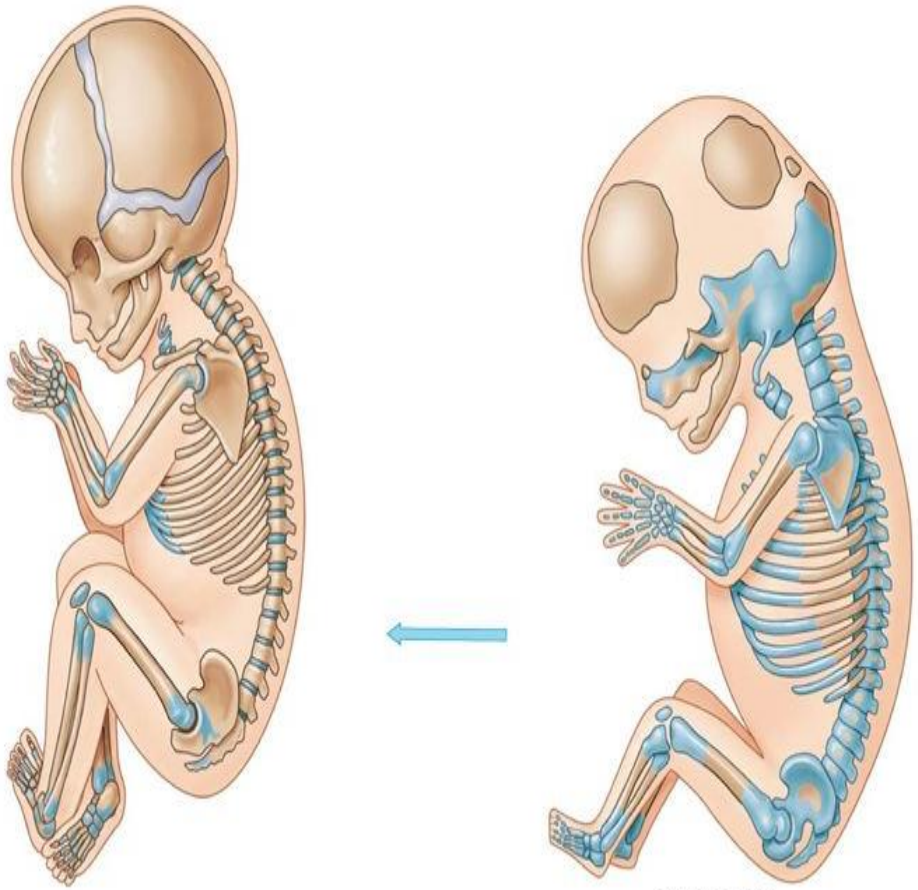
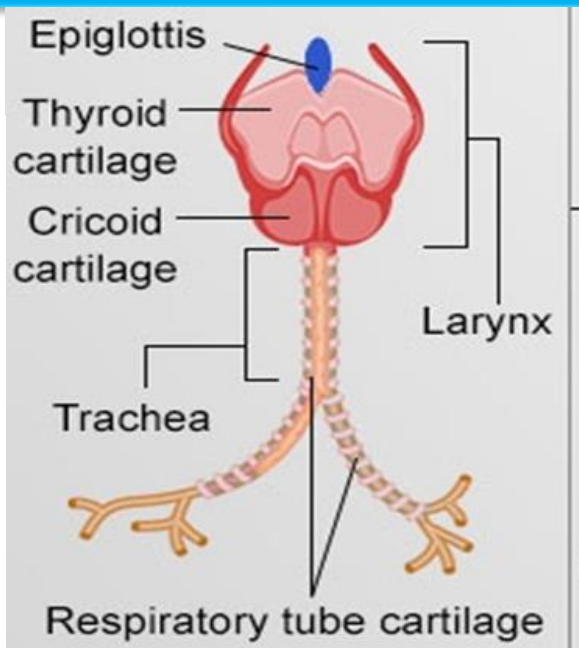
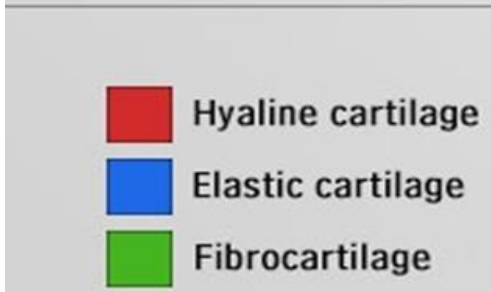
The Development of the Appendicular Skeleton

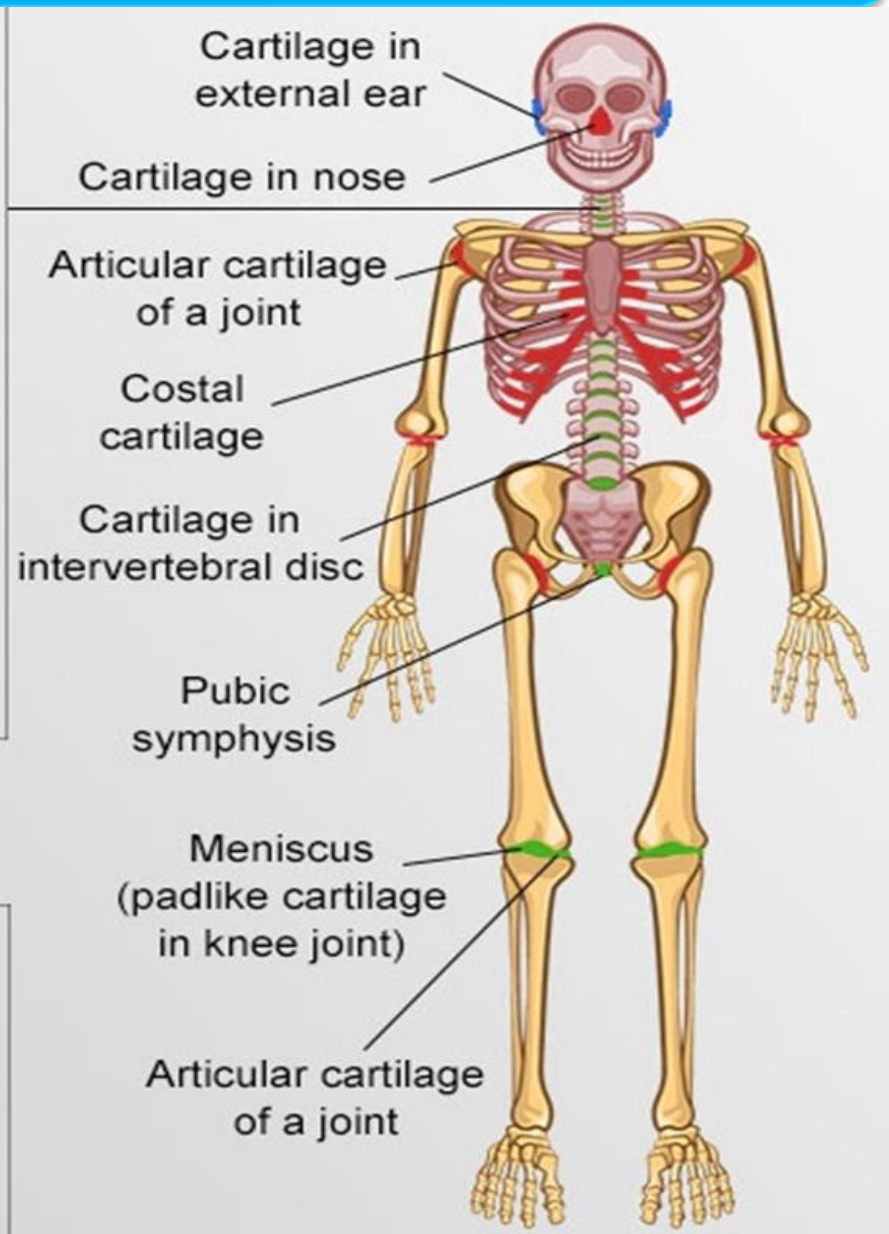


BIRTH

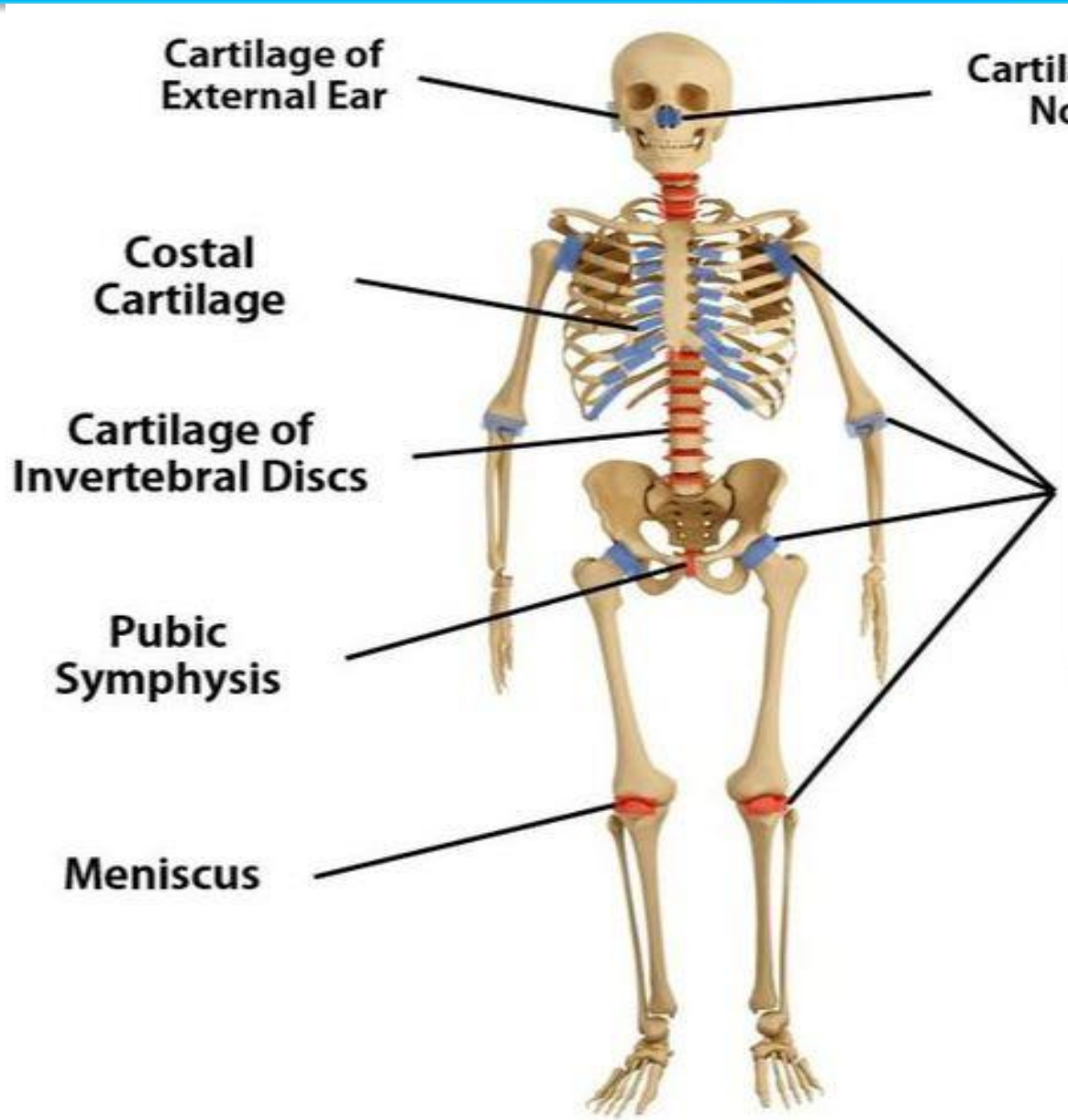
10 WEEKS







2. Fibrocartilage



It is developmental stage between fibrous tissue and hyaline has more collagen fiber than in hyaline type

2. Fibrocartilage

*Provides support and rigidity to the attached and surrounding structures

*It is Strongest of the three types of cartilage.

*It also resists pulling or tearing force ..

3.Elastic Cartilage

Elastic cartilage or yellow cartilage is a type of cartilage present in the outer ear, Eustachian tube and epiglottis. It contains elastic fiber networks and collagen type II fibers.

Provides support.

- Maintain the shape of the area in which it is present.
- Has the ability to recoil after bent

3.Elastic Cartilage