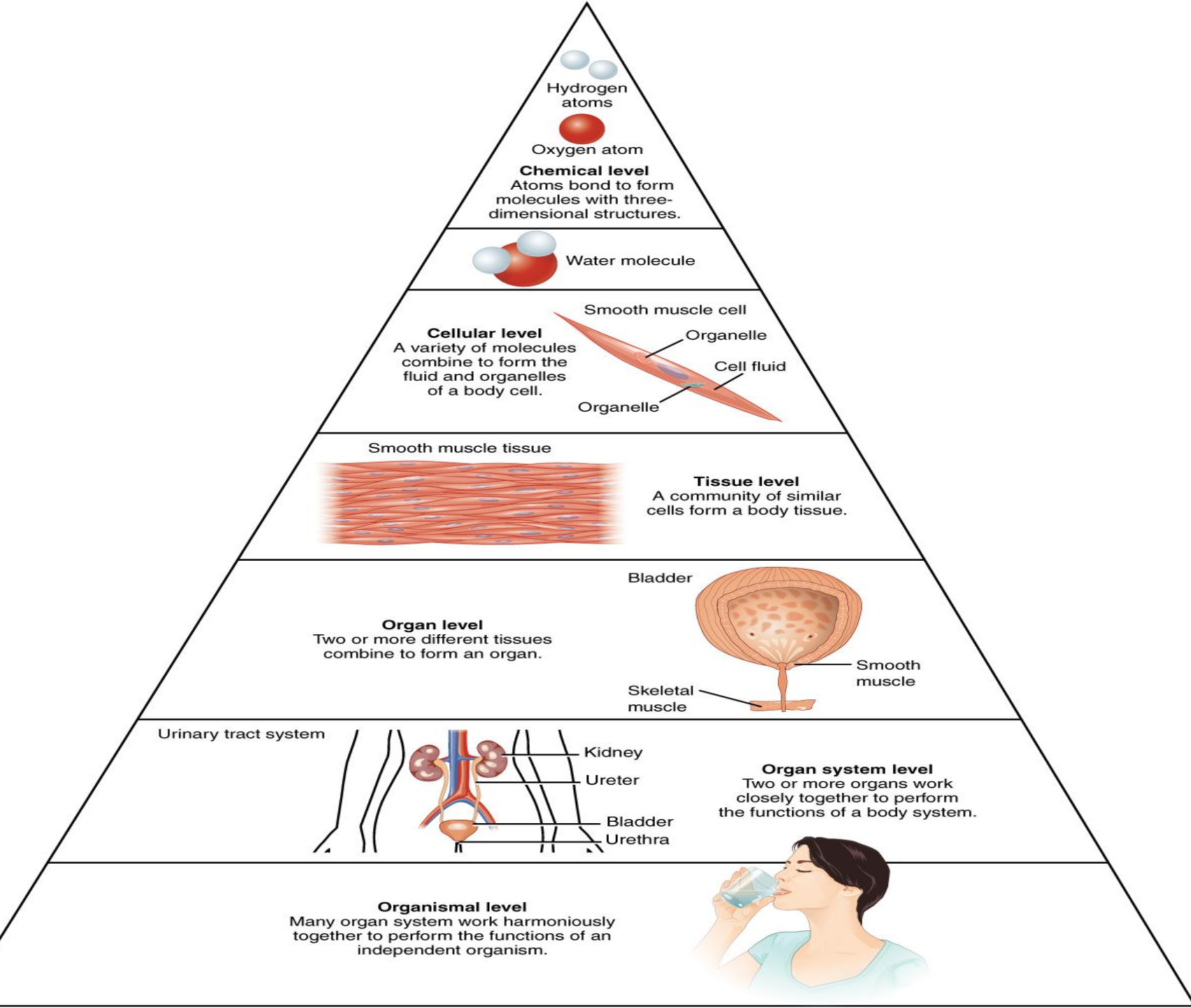


Lecture four

Objectives

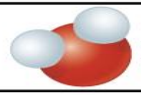
At the end of this lecture you must know classification of basic human tissue , types and their distribution in the human body.



Hydrogen atoms

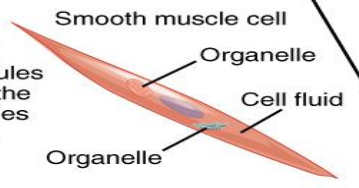
Oxygen atom

Chemical level
Atoms bond to form molecules with three-dimensional structures.



Water molecule

Cellular level
A variety of molecules combine to form the fluid and organelles of a body cell.



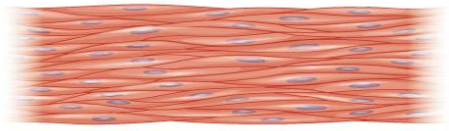
Smooth muscle cell

Organelle

Cell fluid

Organelle

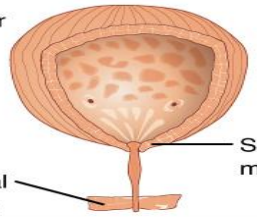
Smooth muscle tissue



Tissue level
A community of similar cells form a body tissue.

Organ level
Two or more different tissues combine to form an organ.

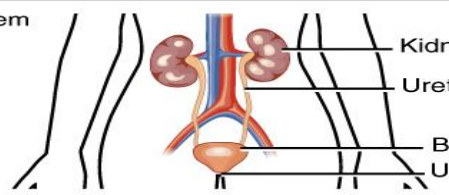
Bladder



Smooth muscle

Skeletal muscle

Urinary tract system



Kidney

Ureter

Bladder

Urethra

Organ system level
Two or more organs work closely together to perform the functions of a body system.

Organismal level
Many organ system work harmoniously together to perform the functions of an independent organism.



Tissues in the Human Body

The human body has many levels of structural organization. The simplest level is the chemical level, which includes tiny building blocks such as atoms. Cells are the smallest functional units of life. The simplest living creatures are single cell creatures, but in complex life forms, such as human beings, cells also exist in the tissue level.

Tissues are groups of similar cells that have a common function. The four basic tissue types are epithelial, muscle, connective, and nervous tissue. Each tissue type has a characteristic role in the body:

1. Epithelium covers the body surface and lines body cavities.
2. Muscle provides movement.
3. Connective tissue supports and protects body organs.
4. Nervous tissue provides a means of rapid internal communication by transmitting electrical impulses.

Organs: Made of Tissues

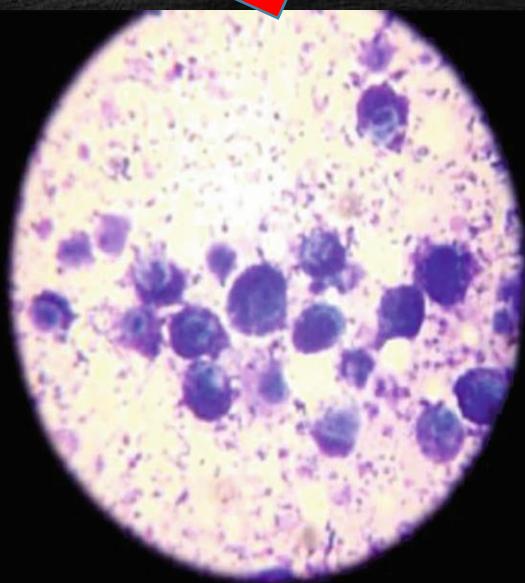
An organ is a structure that is composed of at least two or more tissue types and performs a specific set of functions for the body. The liver, stomach, brain, and blood are all different organs and perform different functions. Each organ is a specialized functional center responsible for a specific function of the body.

At the organ level, complex functions become possible because of the specialized activities of various tissues. Most organs contain more than one tissue type. For example, the stomach consists of smooth muscle tissue for churning movement while it is innervated,

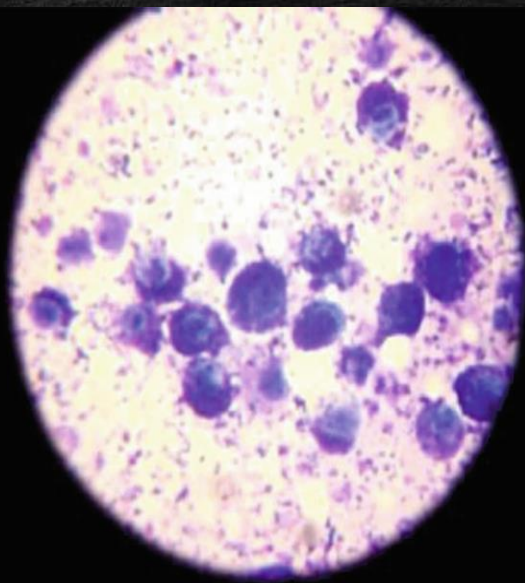
COMPARING THE HUMAN BODY AND CITIES



The 4 basic human tissues



The 4 basic human tissue





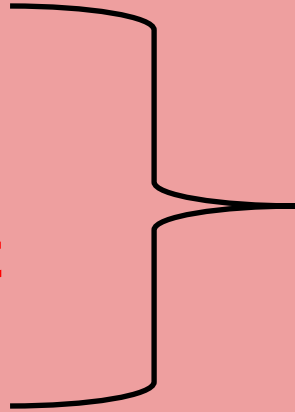
4 basic histological 4 *basic anatomical*

histological

- Epithelial tissue
- Connective tissue
- Nervous tissue
- Muscular tissue

anatomical

Fascia
Tendon
Ligament
Cartilage



Bone , vessel , nerve
and muscle .

❖ Fascia

❖ Tendon

❖ Ligament

❖ Cartilage

Fascia

Fibrous connective tissue arranged in sheets or tubes
it is a binding or packaging tissue that could be found in all parts of the body .



It is like a galaxy that wrap planets
it has no beginning and no end .



1-superficial (subcut.tissue) (hypodermis)

It unites the dermis of the skin to the underlying deep fascia or bones ..

it consist of a mixture of fat and loose areolar c.t.

it could be found everywhere in the human body
e.g. scalp , palm , soles , eyelids , back of the neck ,
penis ,
scrotum and clitoris .

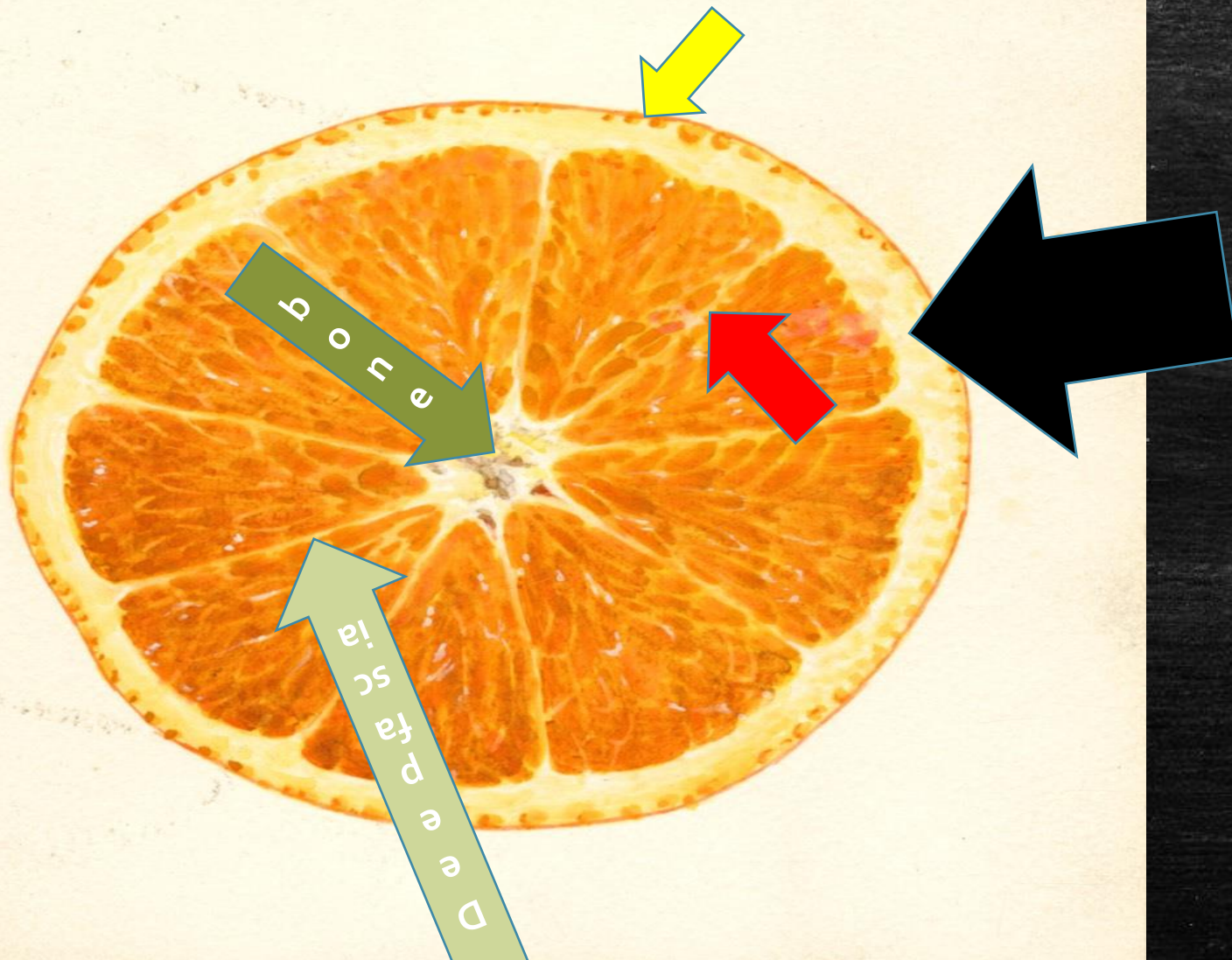
Loose Connective (Areolar) Tissue

Loose connective tissue is distributed throughout the body as a binding and packing material. It binds the skin to the underlying muscles and is highly vascular, providing nutrients to the skin. Loose connective tissue that binds skin to underlying muscles is known as *fascia* (*fash'e-ã*). It also surrounds blood vessels and nerves, where it provides both protection and nourishment. Spe-





It unites the dermis of the skin ↓ to the underlying deep fascia ↓ or bones ..



SUPERFICIAL FASCIA

- **LIES BENEATH THE DERMIS & CONSIST OF LOOSE CONNECTIVE TISSUE & ADIPOSE TISSUE.**
- **STORAGE FOR WATER & FAT**
- **SERVE AS INSULATION PREVENT & PROTECT FROM MECHANICAL DEFORMATION**
- **PROVIDE PATHWAY FOR NERVES & BLOOD VESSELS**



The fat is a substitute for a fur coat in hairless mammals (man, pig, cetacea)



Fur coat VS fat of superficial fascia



FUR



FAT



FUR



FAT

Deep Fascia (investing fascia)

It is a membranous layer of connective tissue devoid of fat that invests the muscles and neurovascular bundles

e.g. Investing fascia of neck.

e.g. Endothoracic fascia of thorax.

e.g. Endoabdominal fascia of abdomen.

e.g. Compartmentalization of limbs muscles.

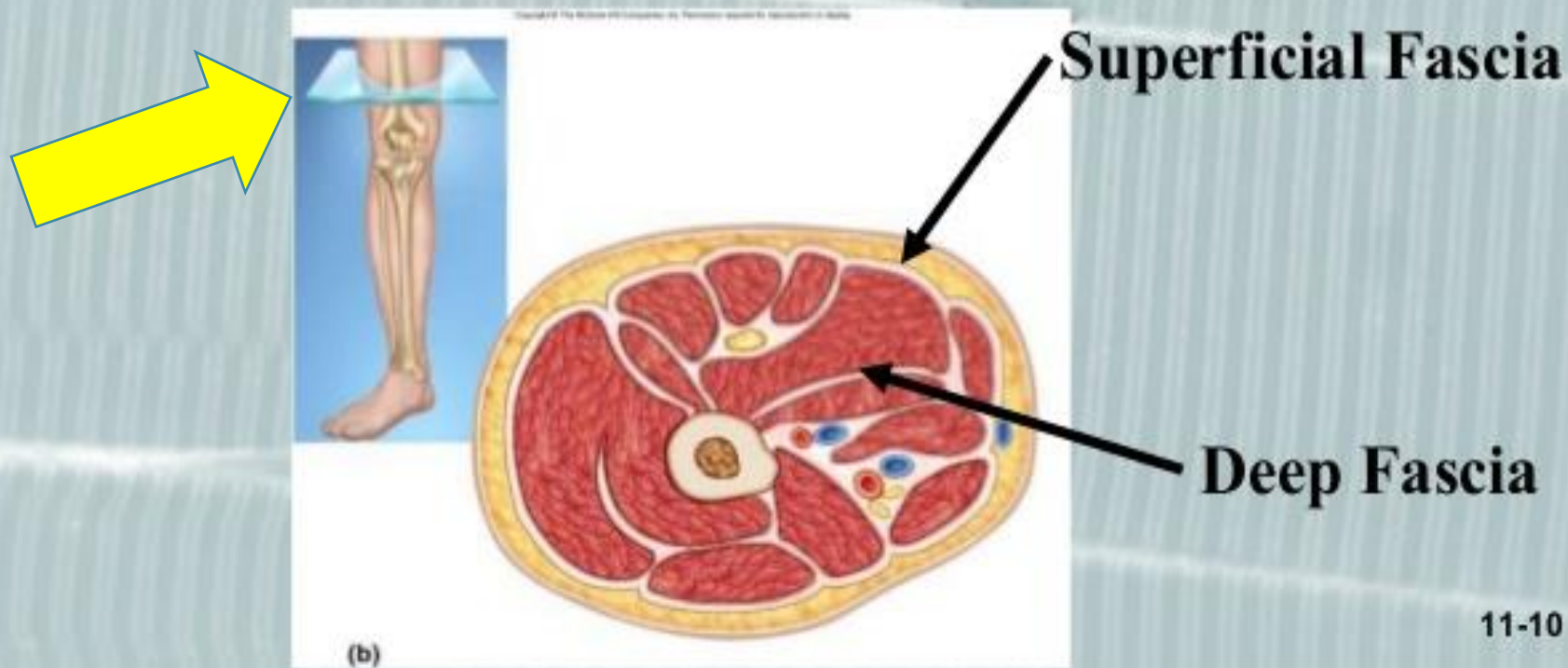
It forms definite sheaths around muscles e.g. femoral sheath
transversalis fascia of the abdomen covering the muscles
and aponeurosis of the anterior abdominal wall.

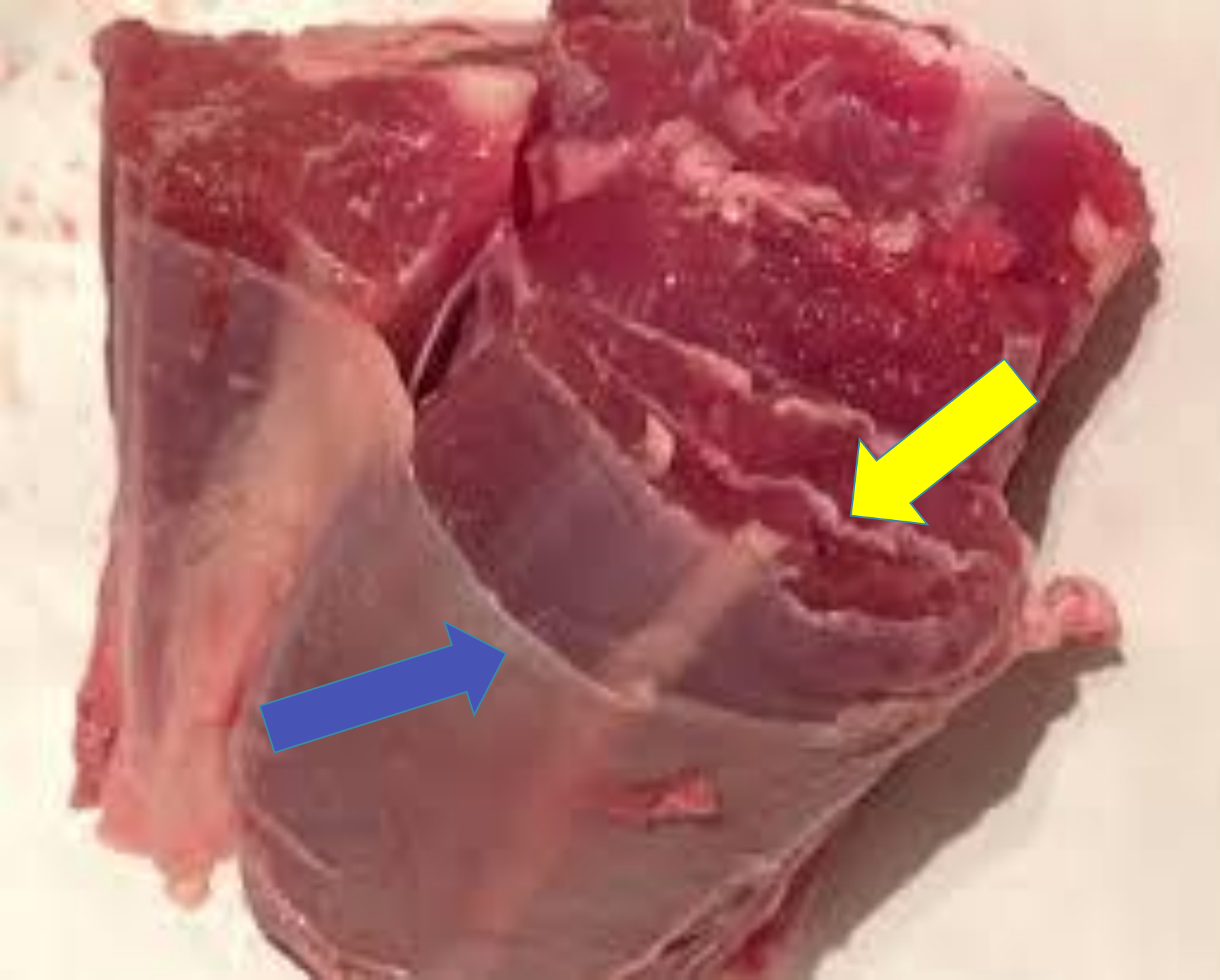
Connective Tissue Elements

Location of Fascia

2 types:

1. **Deep fascia**
 - found between adjacent muscles
2. **Superficial fascia (hypodermis)**
 - adipose between skin and muscles

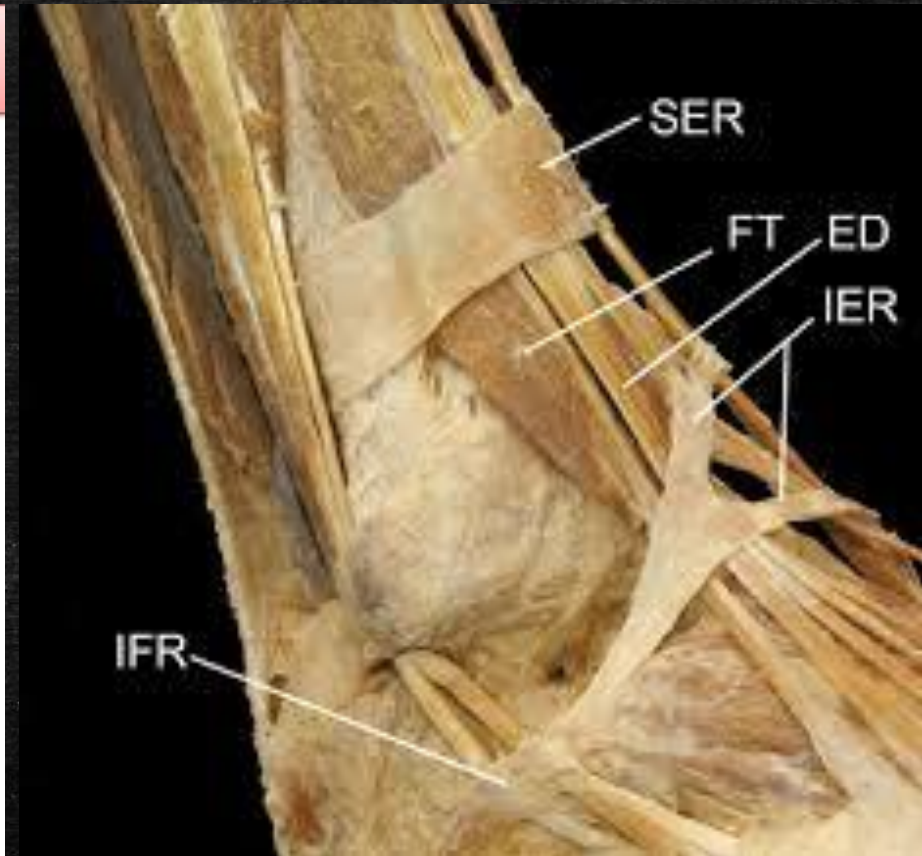




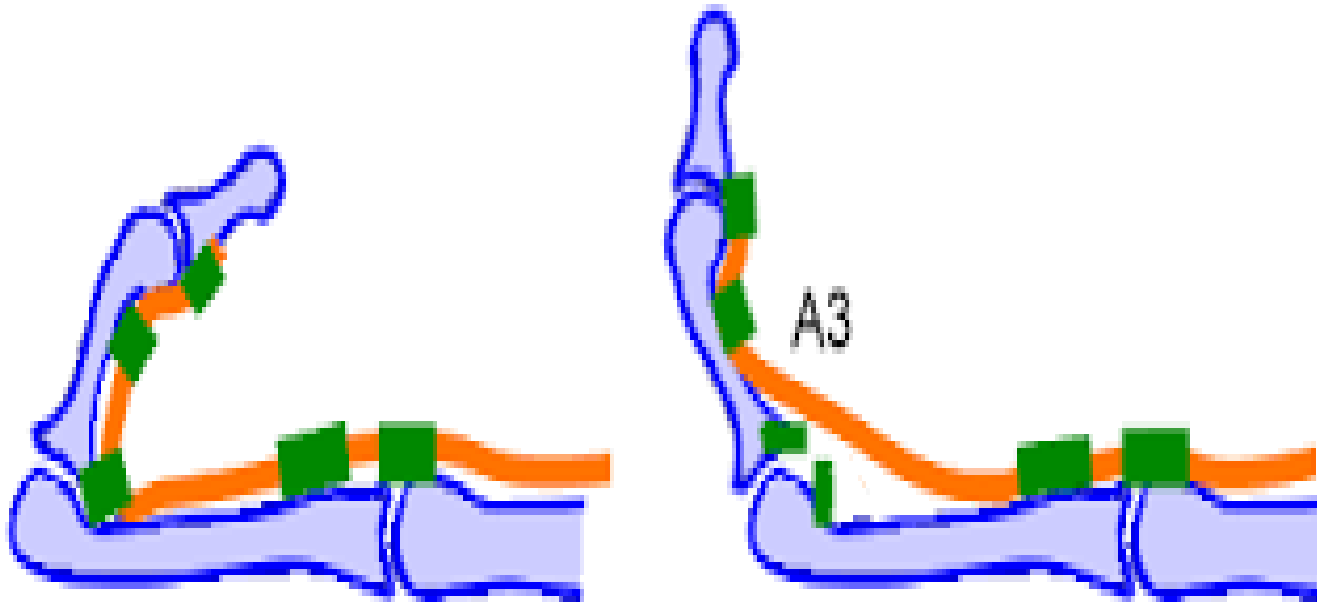
In the region of joints (wrist and ankle) it is thickened to form band like structures called retinacula or retinaculum that function as a pulley holding tendons in position .

SER=superior extensor retinaculum
IER=inferior extensor retinaculum

Extensor retinaculum of hand



Bowstringing phenomena



intact pulley

ruptured A3 pulley

Bowstring Phenomenon



lastly you cant ignore fascia if you

dissect any region
of the human
body it is
everywhere



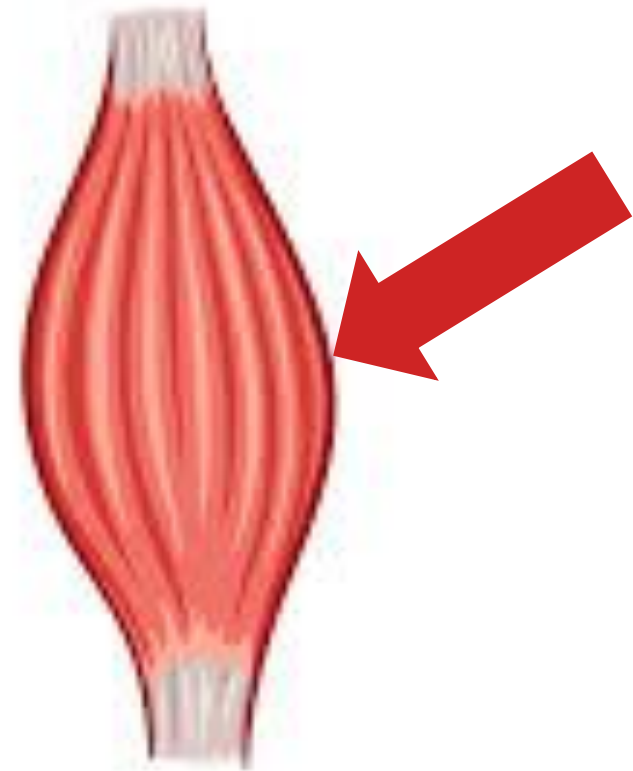
Inflammation of the fascia called fasciitis



Tendon

Each muscle consist
of

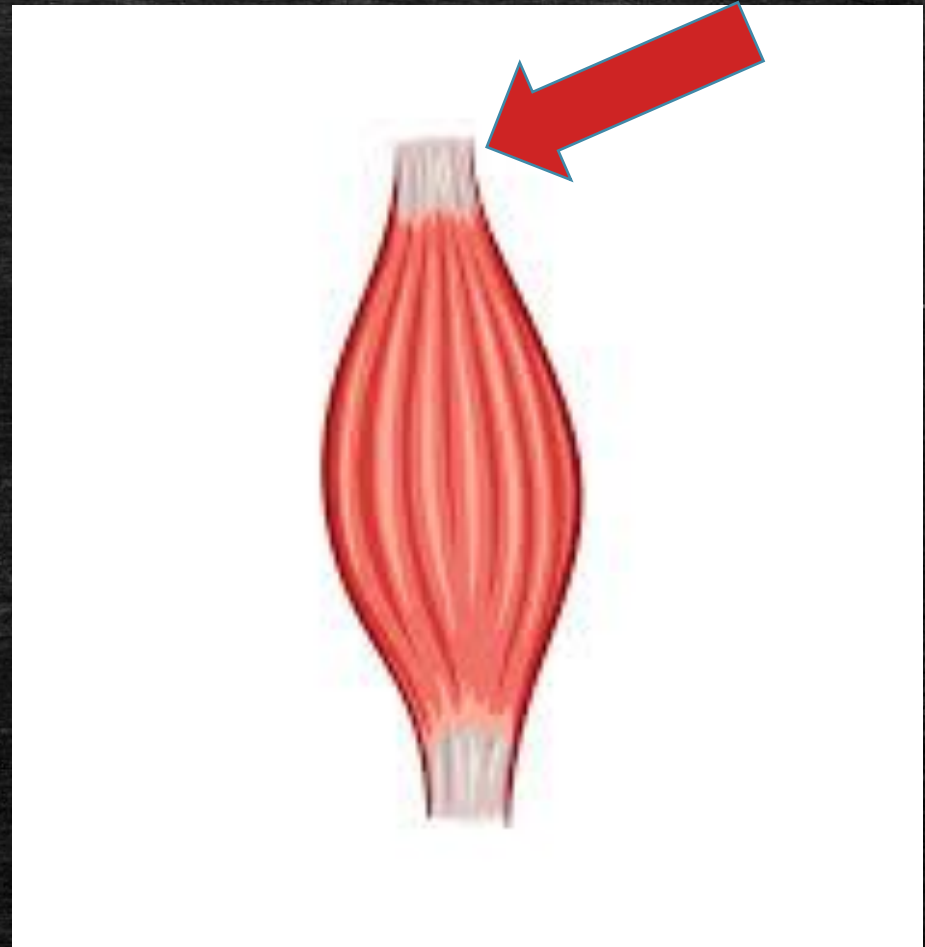
Fleshy brown part
called Belly



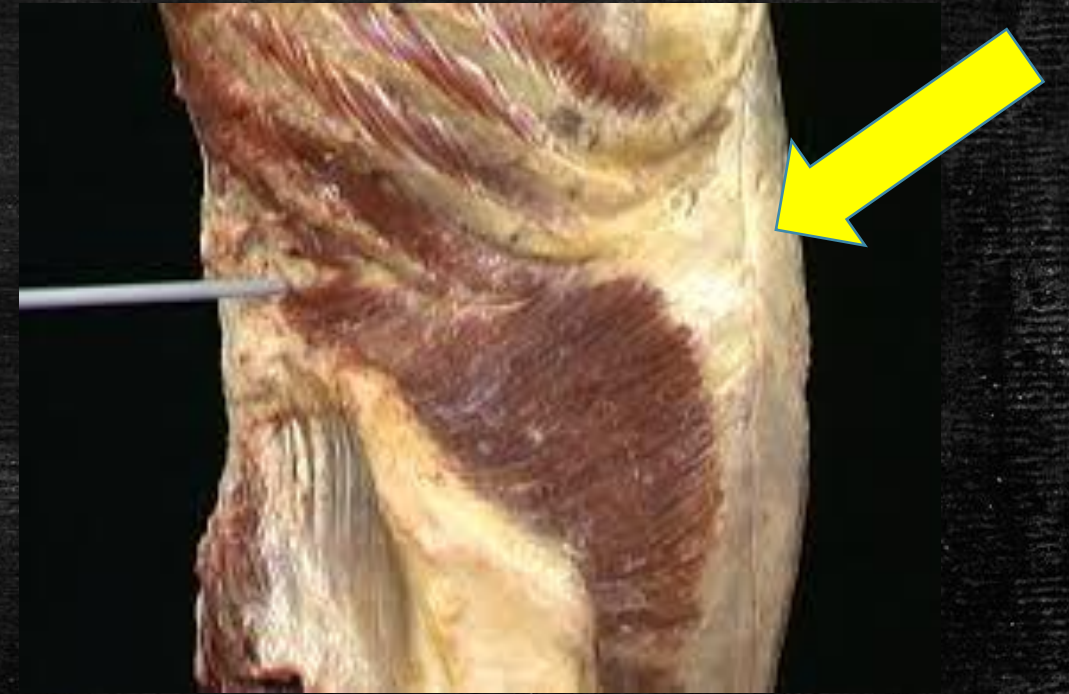
and fibrous white
part

called tendon

*if the tendon is flat
called aponeurosis*



aponeurosis



Tendons are :

cord like fibrous structure it is part of the muscle attaches it to both origin and insertion

it consist of parallel fasciculi of collagen it is resistant to stretching but at the same time it is flexible and attaches voluntary muscle to other structures (usually bone)

Tendons often work across bones & for this they are subjected to friction but they gain protection by several

structures such as bursa , tendon sheath , cartilage and sesamoid bones .

bursae are flattened sac-like fluid filled structures lined by synovial membrane they are founded separating tendons from bones , muscles , ligaments & skin .

Bursitis



Tendon sheaths are specialized tubular bursa that wrap around tendons.

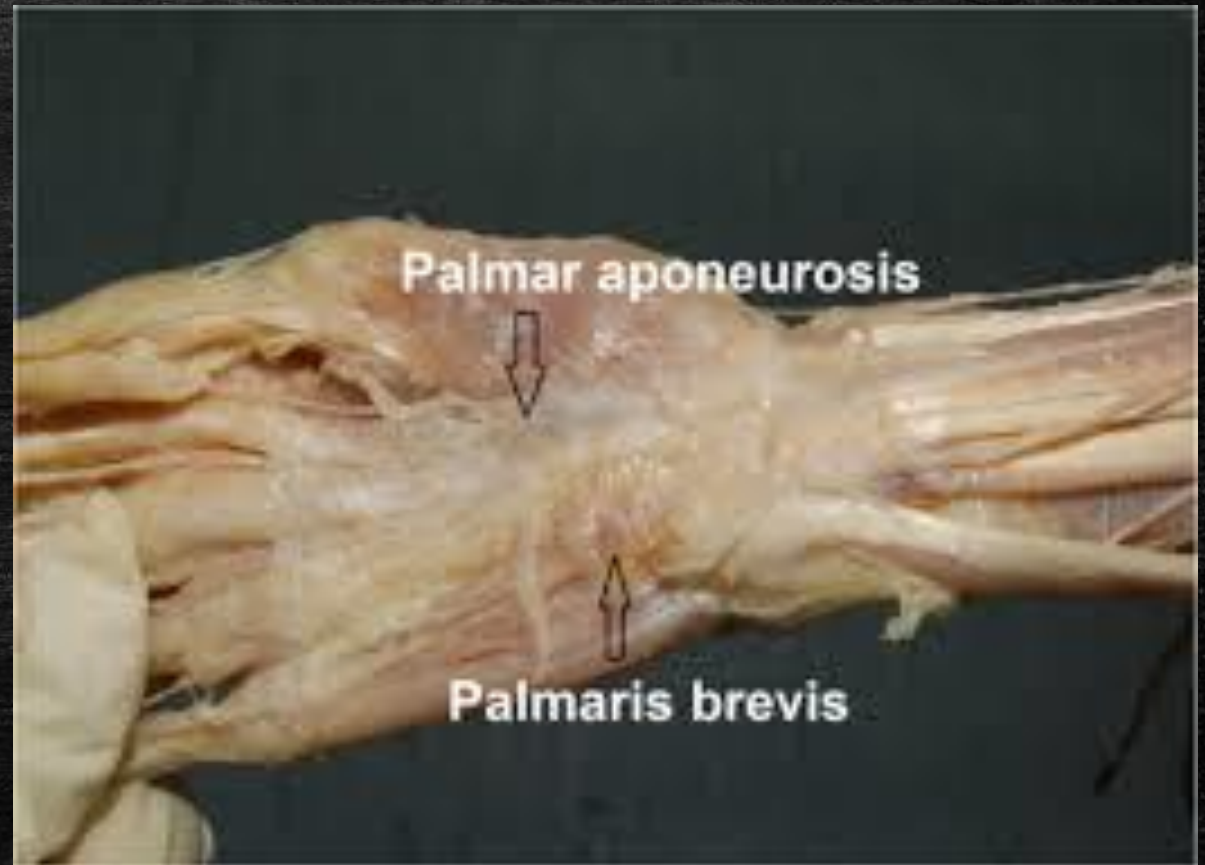


types of tendon

□ Thick tendon :

located at the ends of the muscle near origin and insertion region it is mostly cylindrical cord-like

- Thin tendons :
they are flat thin sheets
called aponeurosis .



Ligaments

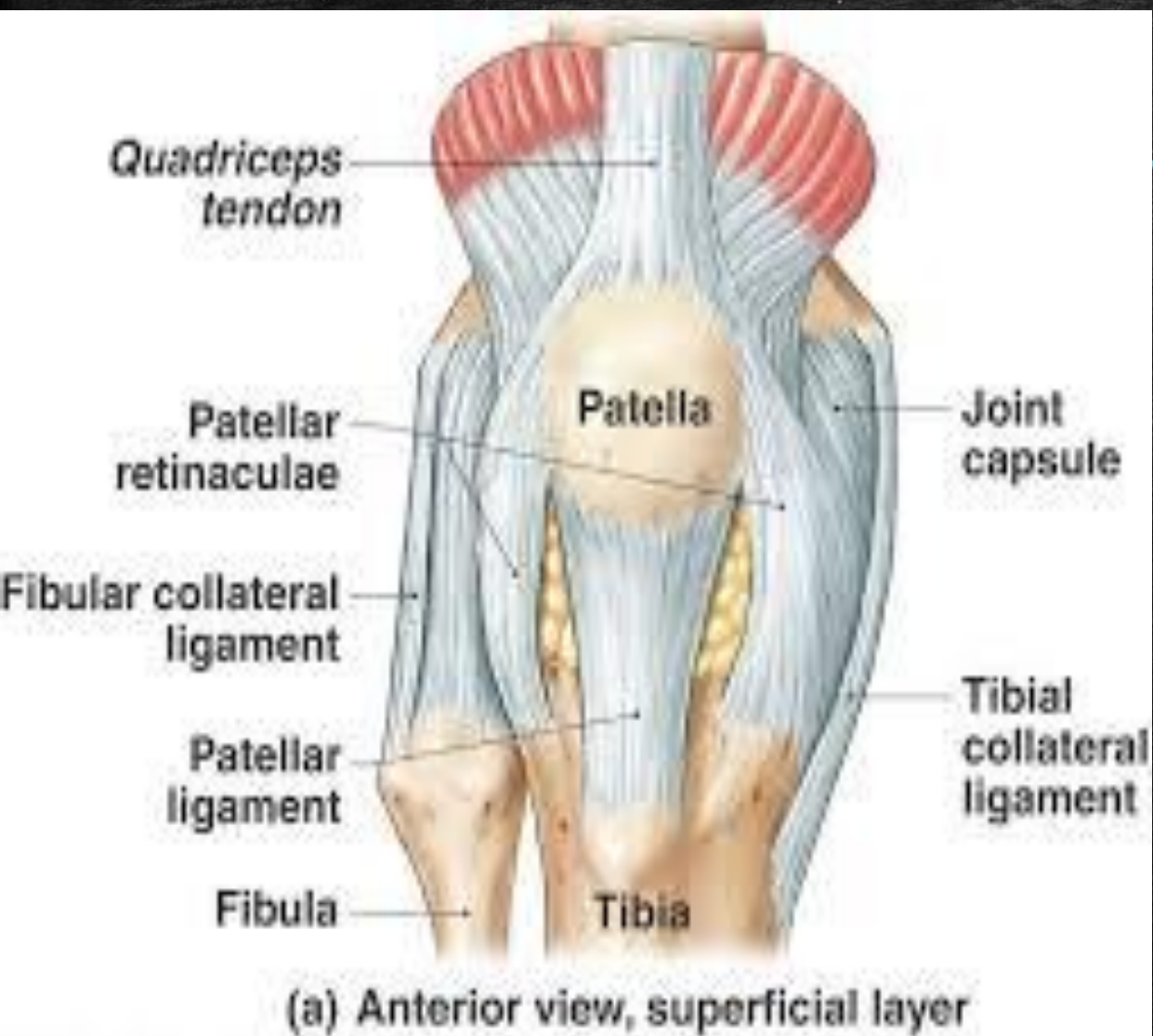
are cords of dense C.T. Thicker than fascia and tendon
in comparison to tendon , ligaments always connect
something to something else , while tendons connect muscle
to something else .

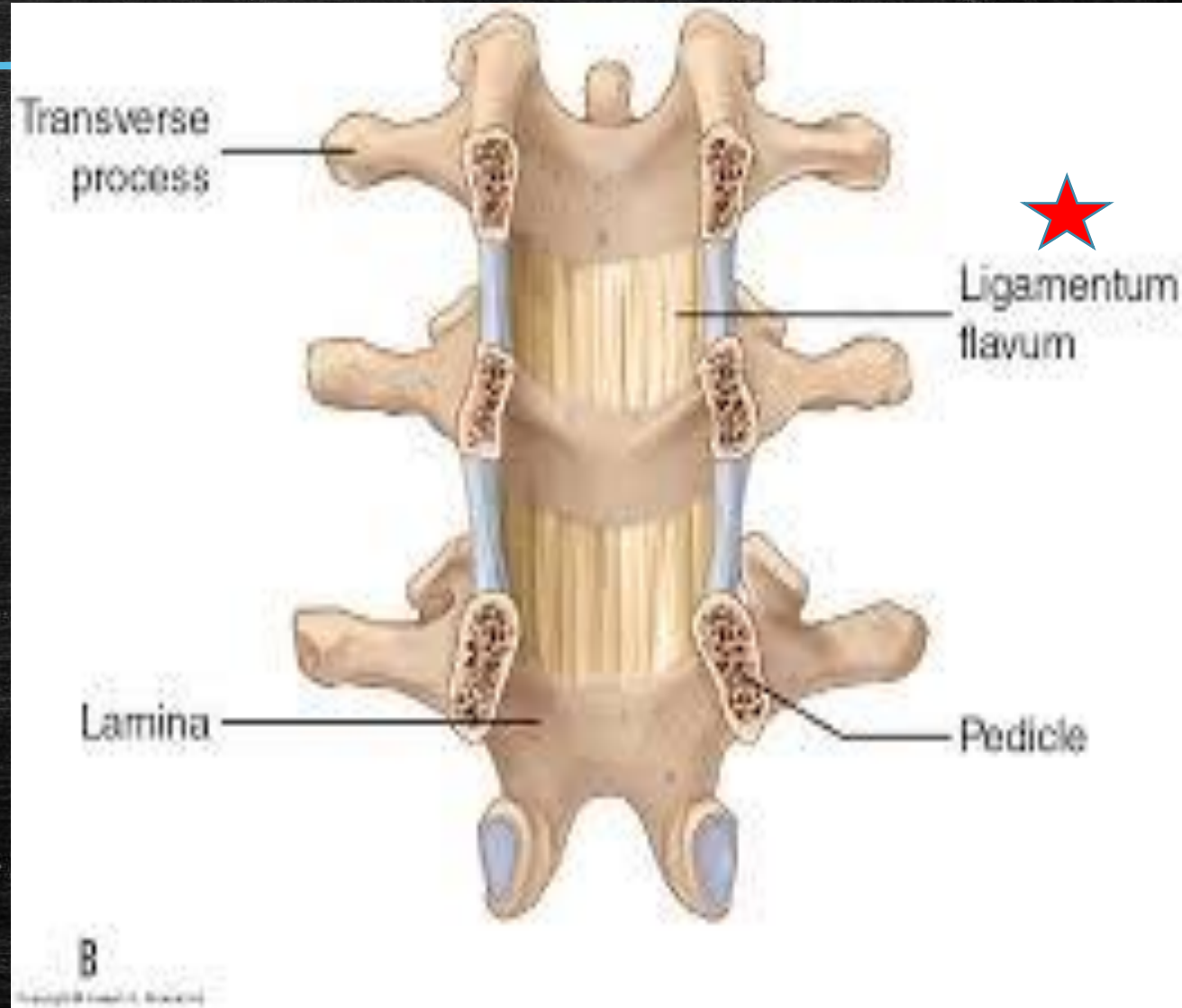
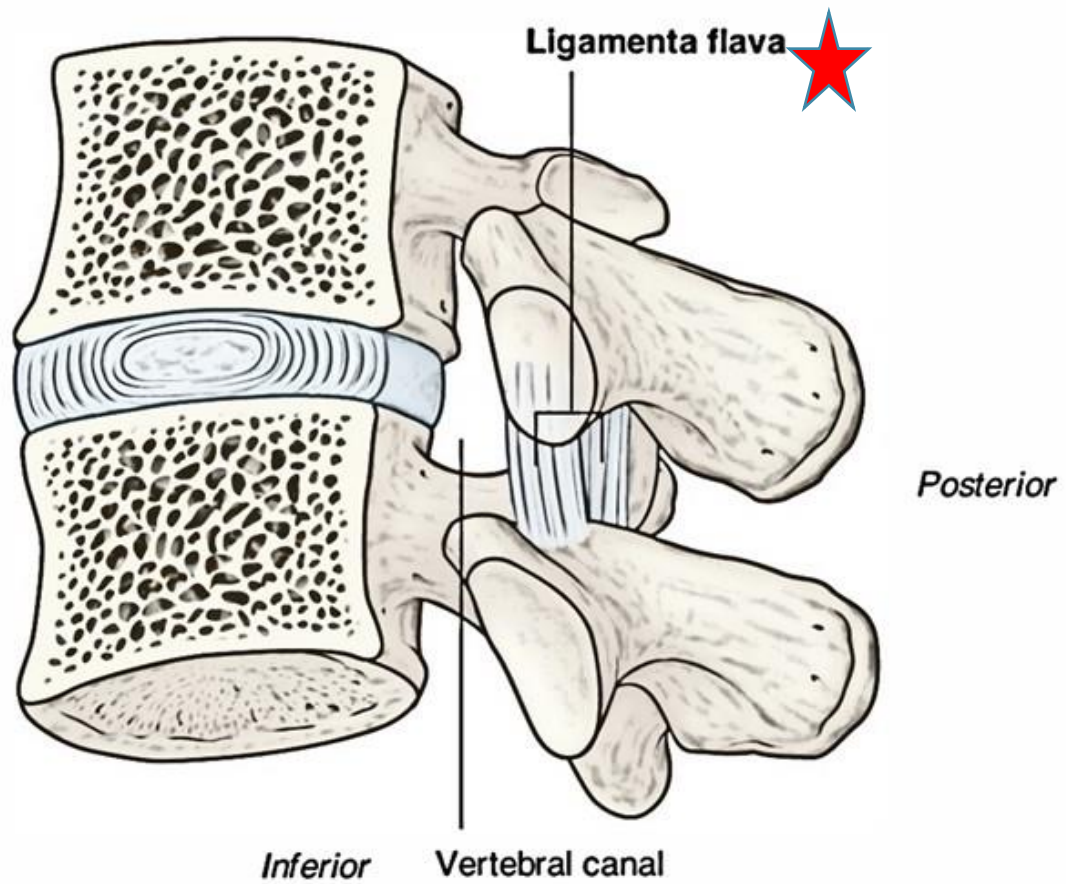
Types of ligaments

❖ Thick (skeletal) ligaments :

they connect bone to bone across joints like :

- ✓ patellar ligament of the knee
- ✓ ligamenta flava of the vertebral column

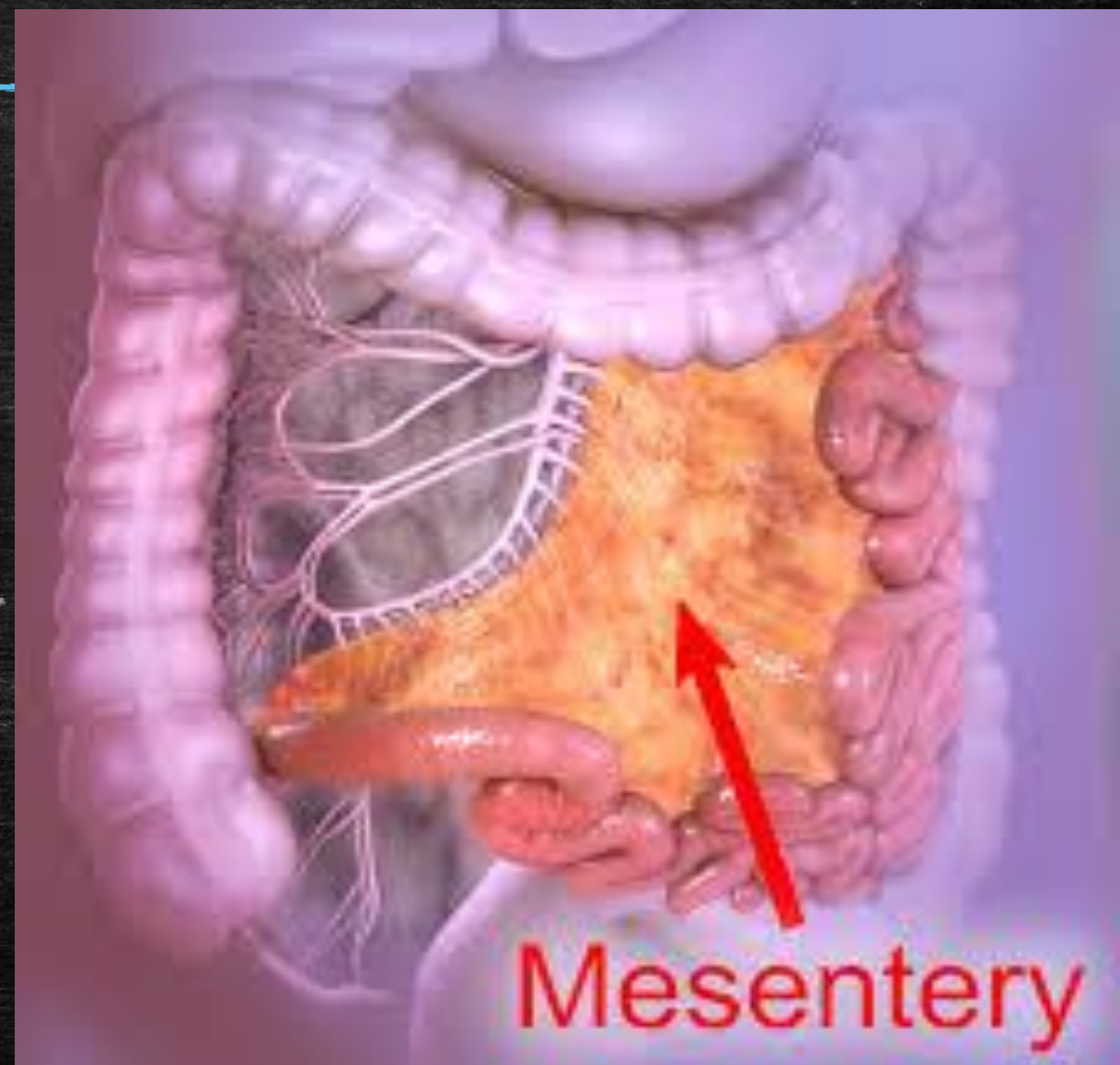


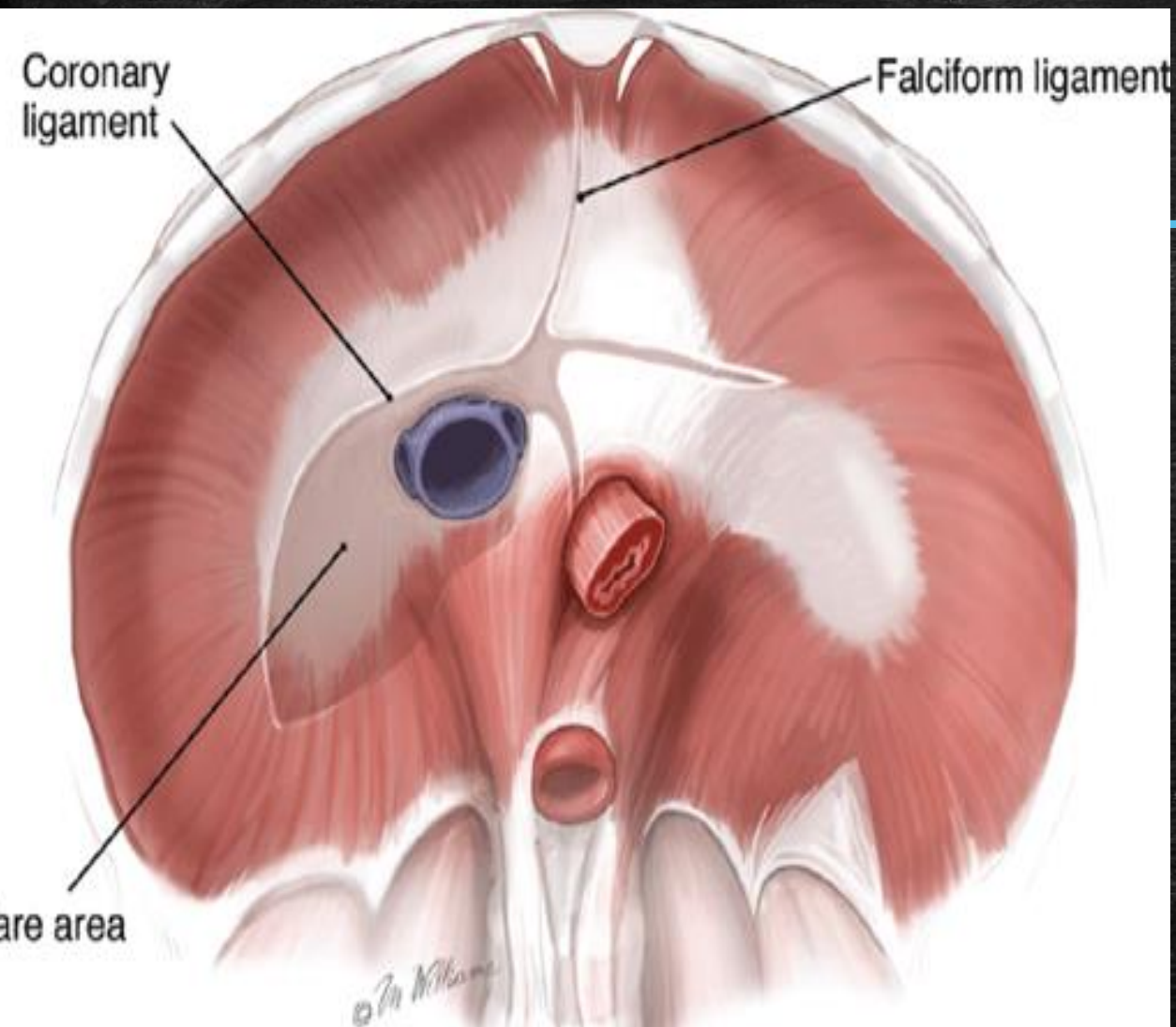


❖ Thin (visceral) ligaments :

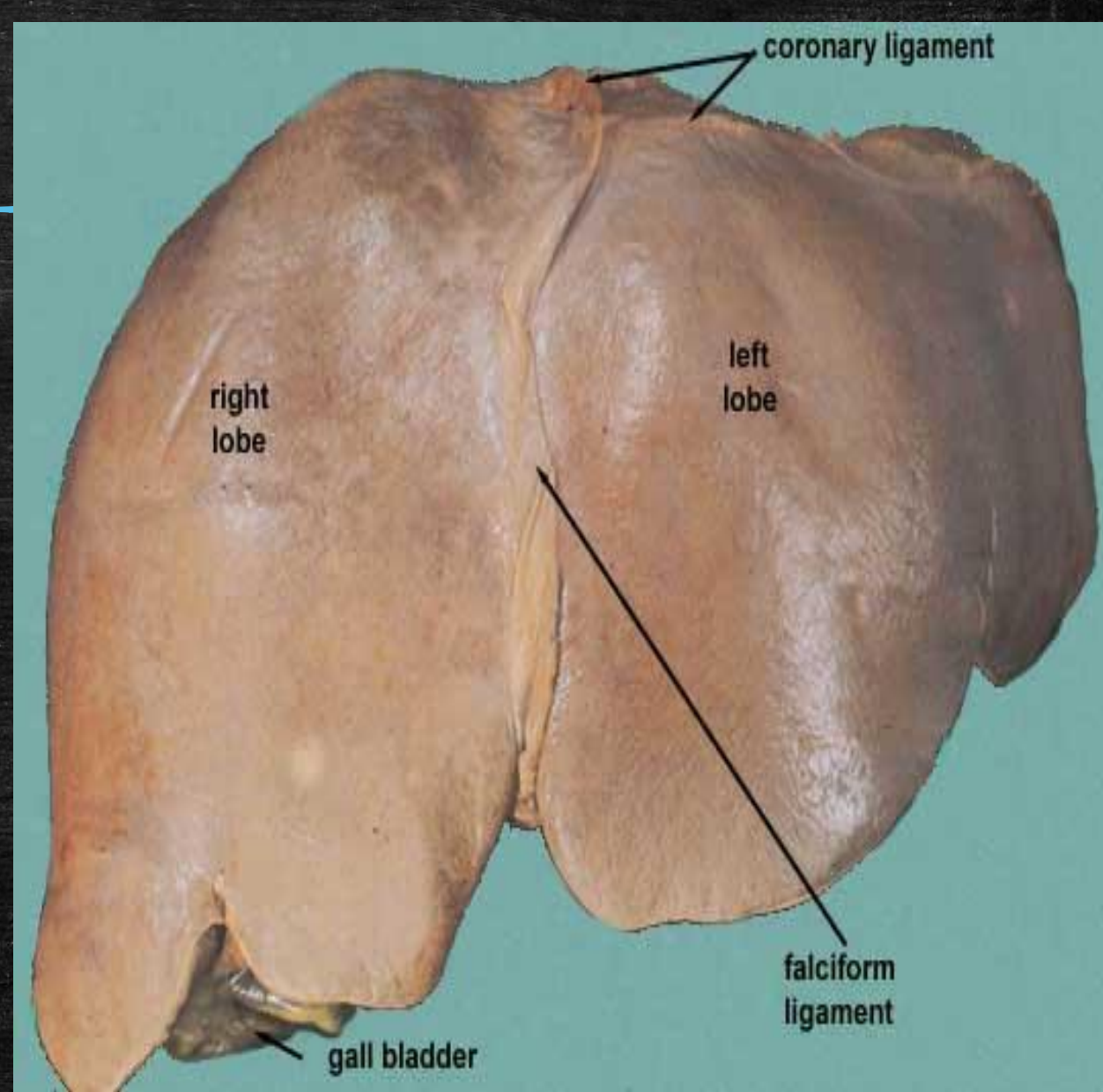
they are related to the viscera and conducting blood, lymphatic vessels and nerves to a viscus e.g. Mesenteries that connects intestine to the posterior abdominal wall.

other e.g. Coronary ligament that connects liver to the diaphragm.

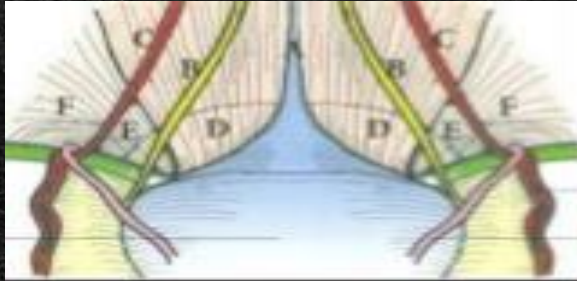




Source: D. J. Sugarbaker, R. Bueno, Y. L. Colson, M. T. Jaklitsch, M. J. Krasna, S. J. Mentzer, Williams, A. Adams: *Adult Chest Surgery*, 2nd Edition: www.accesssurgery.com
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other e.g. medial Umbilical ligaments
(remnants of umbilical arteries)



Medial Umbilical Ligament



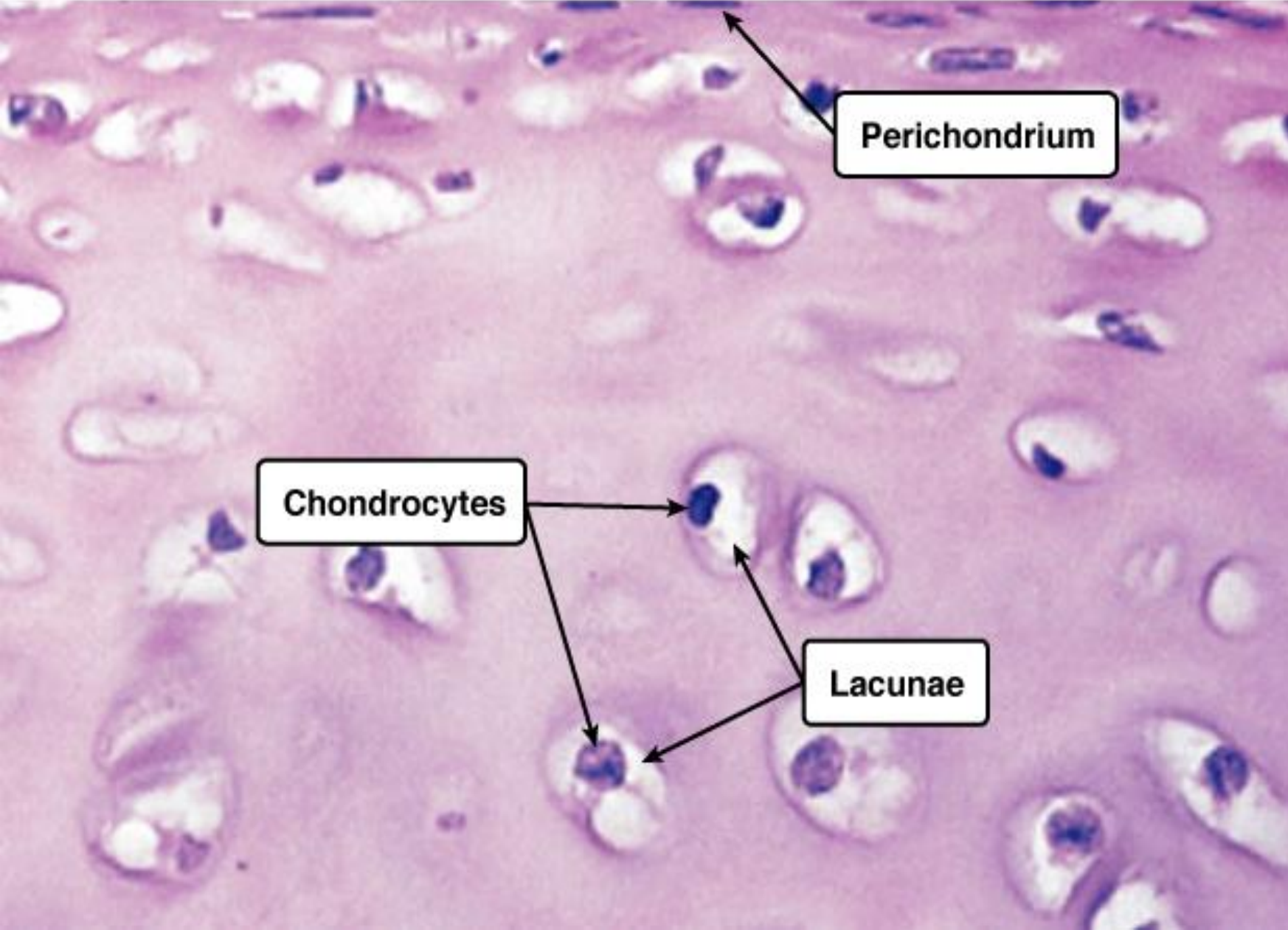
- Obliterated Umbilical artery
- Medial end of dissection

Cartilage

It is a form of C.T. In which the cells and fibers embedded in a jel like matrix .

It form parts of the skeleton where more flexibility is required , it less rigid than the bones having smooth surfaces so it present at the end of the bones allowing the joint to move with less friction so called articular cartilage .

Structure of Hyaline Cartilage



During embryonic life all the bones take form as cartilage latter in the prenatal or early postnatal period become ossified and transformed into bones at the epiphyseal plates of the growing bones .

Types of cartilage

Hyaline cartilage

- Articular cartilage
- Rings of trachea , ribs

Fibrous cartilage

- Intervertebral discs
- Labrum of hip, shoulder, mensci

Elastic cartilage

- ENT

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bullet
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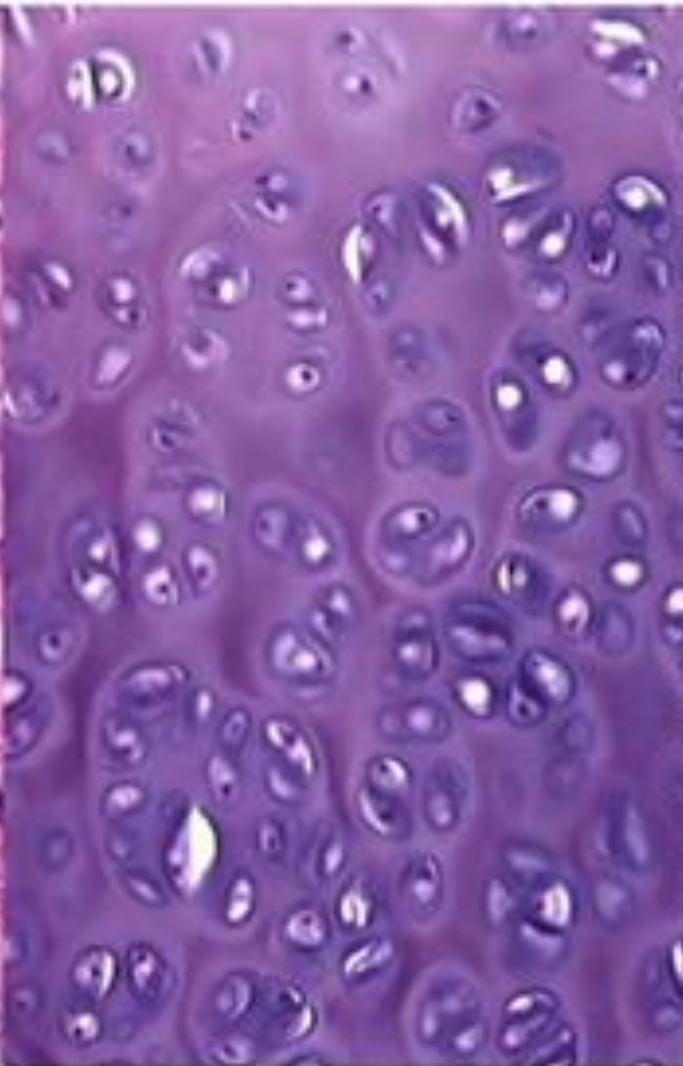
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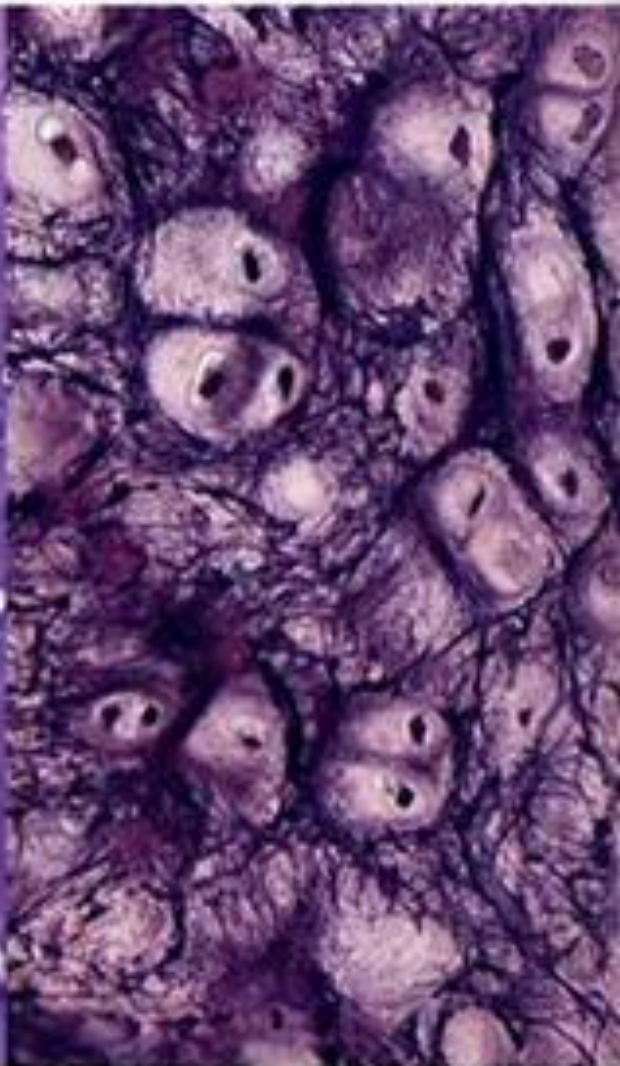
Fibrocartilage



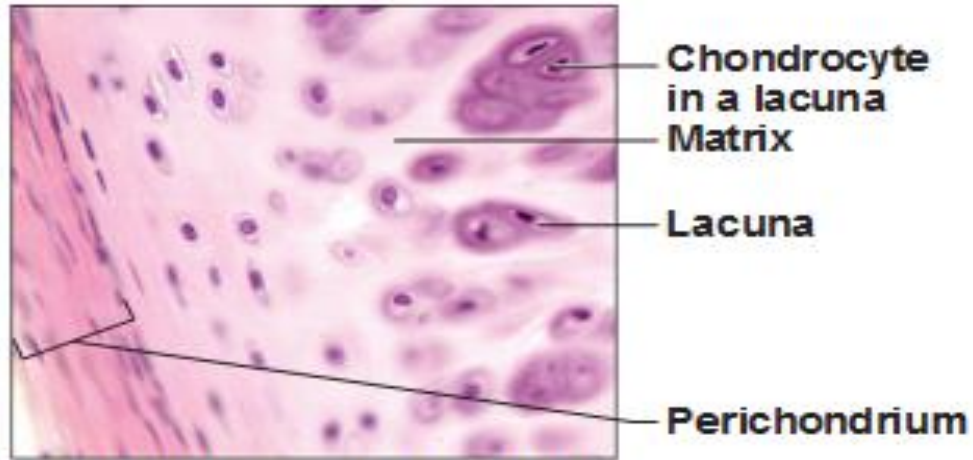
Hyaline cartilage



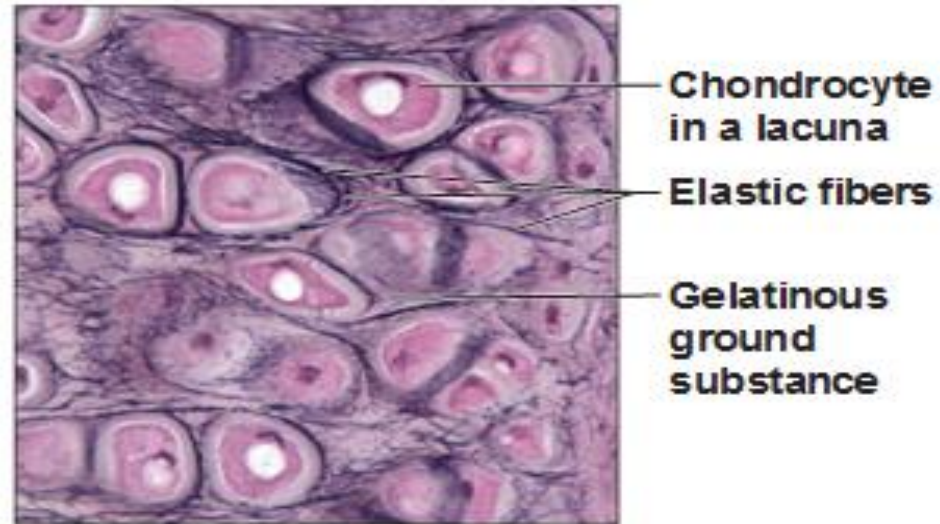
Elastic cartilage



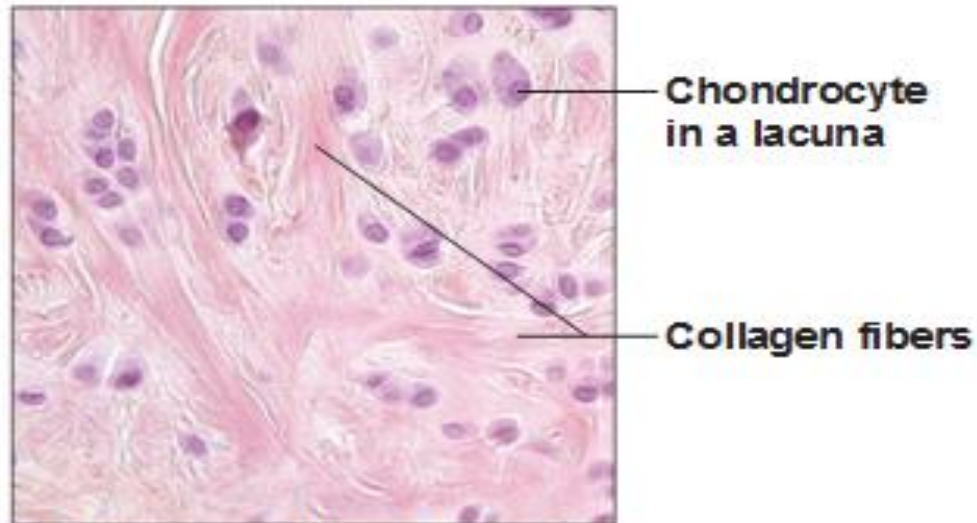
Cartilages in the Adult Body



(a) Hyaline cartilage (180 \times)



(b) Elastic cartilage (470 \times)



(c) Fibrocartilage (285 \times)

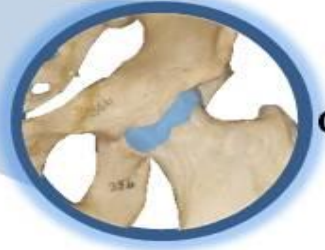
The chondrocytes within cartilage may occur singly but are frequently clustered. Chondrocytes occupy cavities, called **lacunae** (*lä-kyoo'ne*—singular *lacuna*), within the matrix. Most cartilage is surrounded by a dense irregular connective tissue called **perichondrium** (*per''i-kon'dre-um*). Cartilage at the articular surfaces of bones (articular cartilage) lacks a perichondrium. Because mature cartilage is avascular, it must receive nutrients through diffusion from the perichondrium and the surrounding tissue. For this reason, cartilaginous tissue has a slow rate of mitotic activity; if damaged, it heals with difficulty.



A. Elastic cartilage

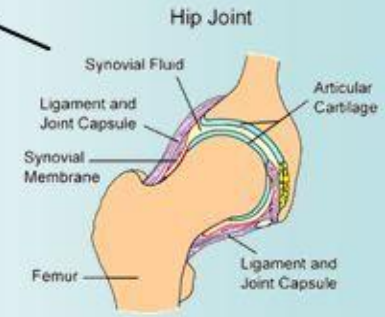
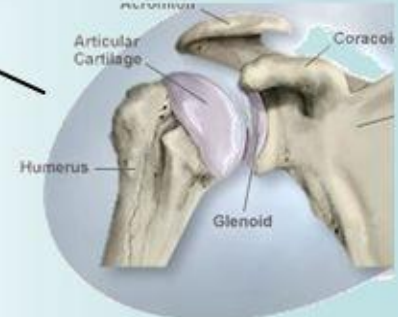
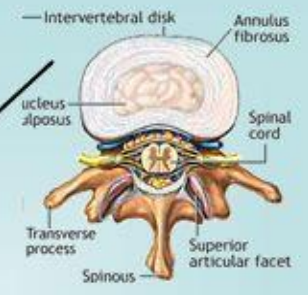
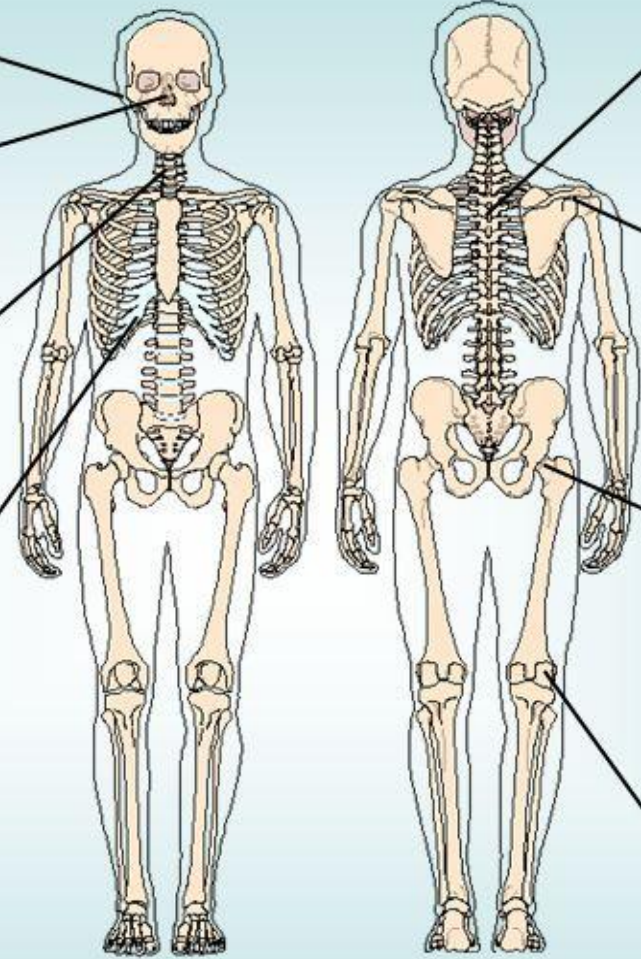
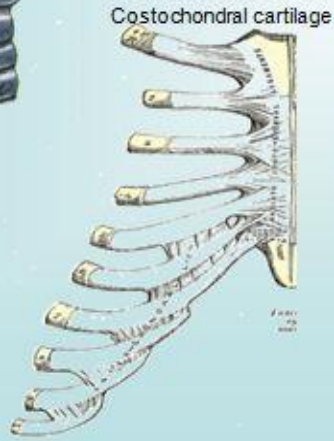
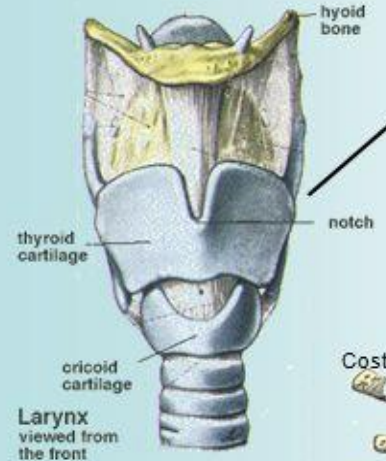
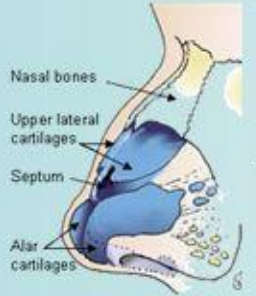


B. Fibrocartilage



C. Hyaline cartilage

CARTILAGE IN THE HUMAN BODY





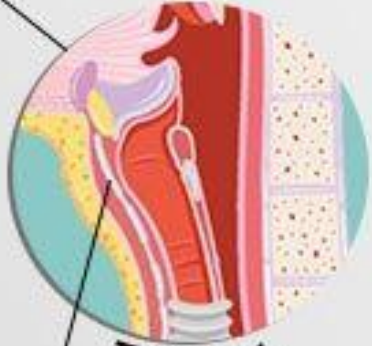
Elastic cartilage

Ear



Hyaline cartilage

Nose



Throat



Rib cage

Hyaline cartilage

Distribution of Cartilage

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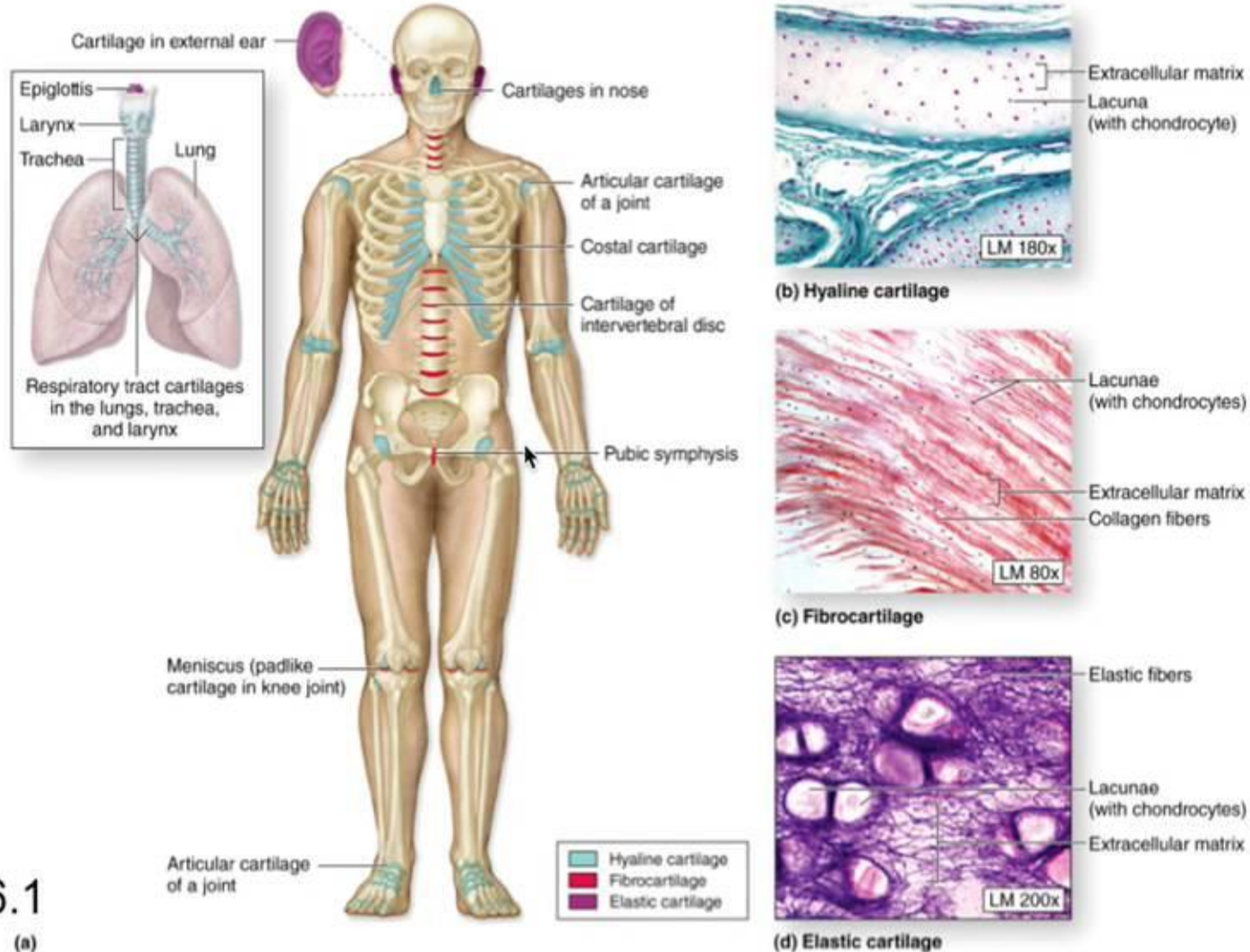
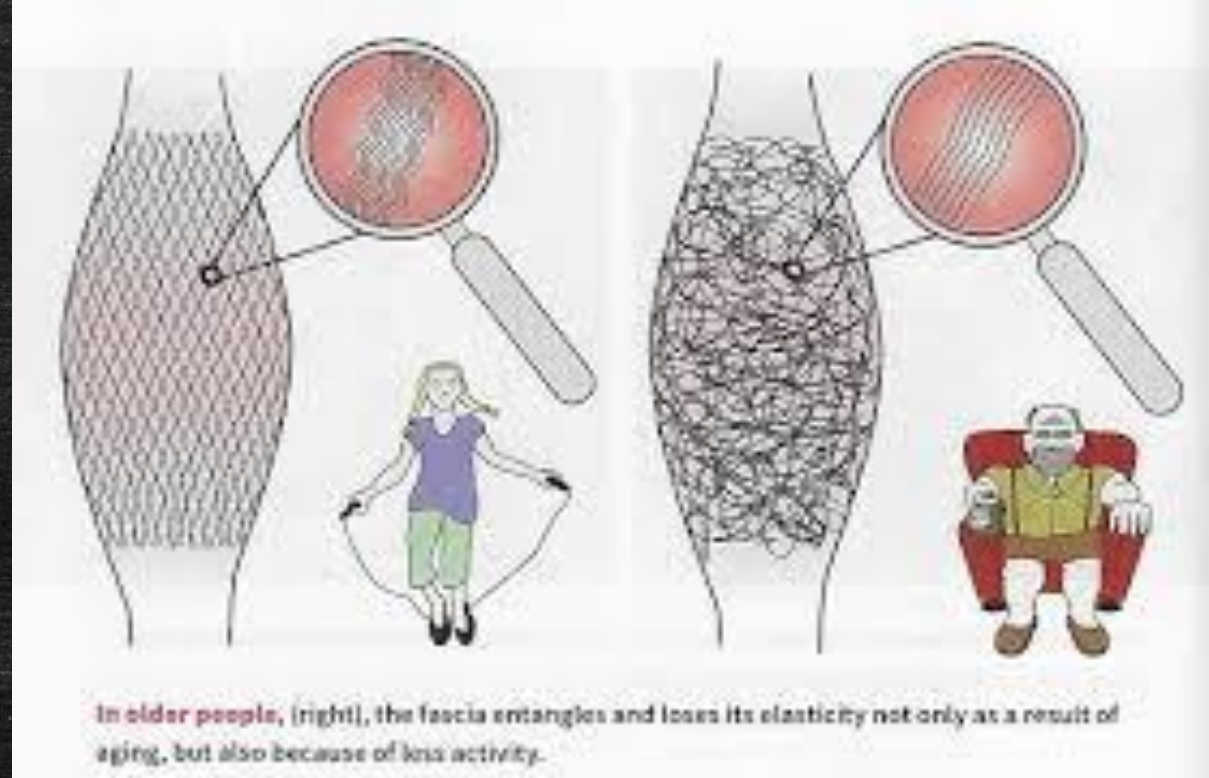


Figure 6.1
(a)



In older people the fascia entangles and loss its elasticity not only as a result of aging but also because of loss of activity .



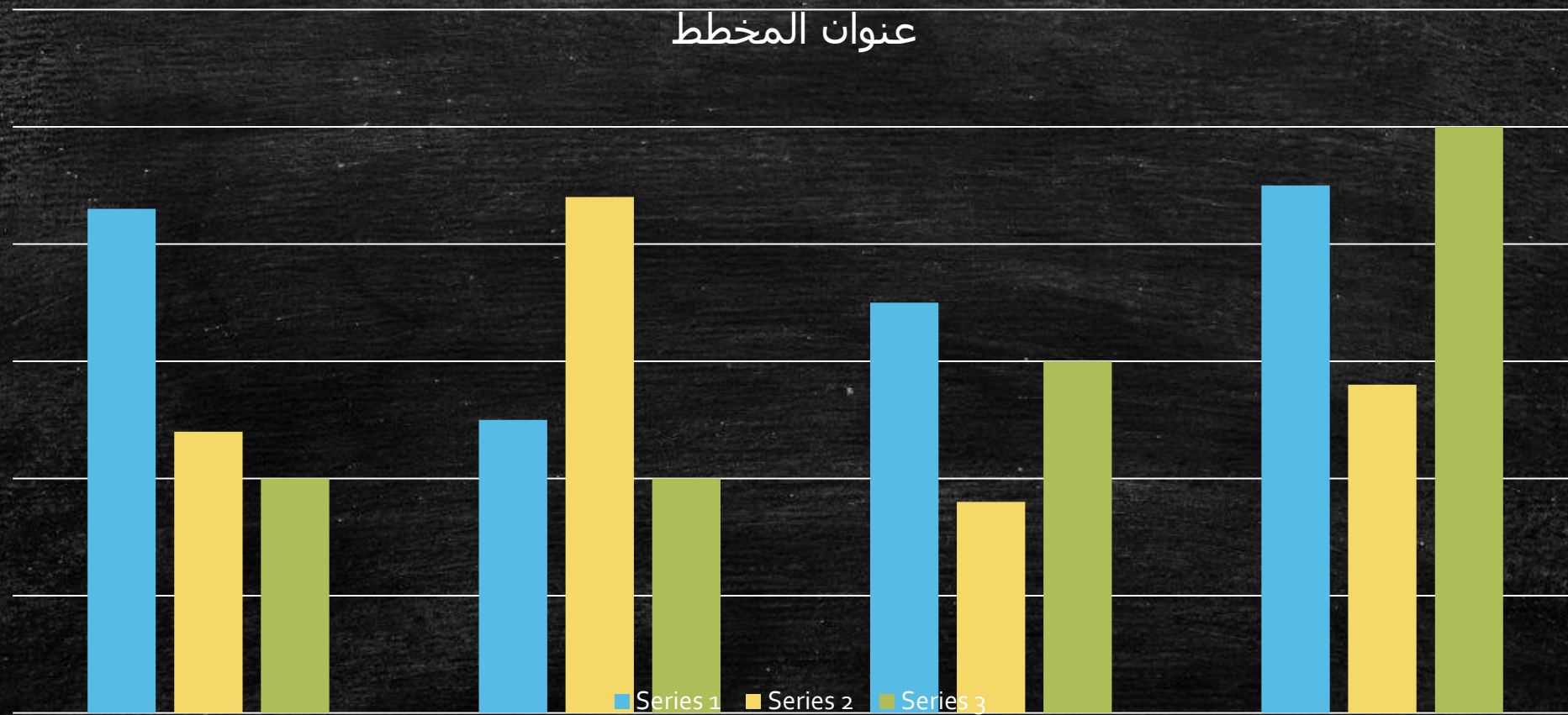
Title Layout

Subtitle

Title and Content Layout with List

- Add your first bullet point here
- Add your second bullet point here
- Add your third bullet point here

Title and Content Layout with Chart



Two Content Layout with Table

- First bullet point here
- Second bullet point here
- Third bullet point here

| Class | Group A | Group B |
|---------|---------|---------|
| Class 1 | 82 | 95 |
| Class 2 | 76 | 88 |
| Class 3 | 84 | 90 |

Add a Slide Title - 1

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