

A Happy
Easter



Anatomy L1 : Anatomical terms

Definition of anatomy :

It is the science dealing with the study of the

structure تكوين

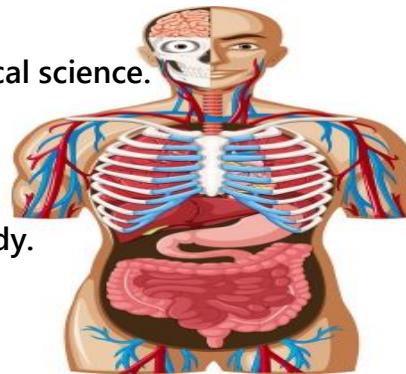
arrangement ترتيب

geography جغرافيا

of the human body, which forms the keystone for all other branches of medical science.

Main points we will cover :

- Brief history
- Medical Terminology
- Anatomical planes, directions & movements



History :

- From three hundreds BC and second century.
- Scientist, Doctors and artist would experiment and practice on the dead body.
- Cadavers were positioned flat on their backs , thus making it easier to draw and reference from that position.

Methods used in the study of anatomy

Gross anatomy
(Macroscopic)

Radiological anatomy

Applied anatomy

Living anatomy

Cross-sectional anatomy

Surgical anatomy

Surface anatomy

❖ Gross anatomy (Macroscopic) :

It is the study of anatomy on **dead** bodies...



The cadavers by the naked eye by dissection



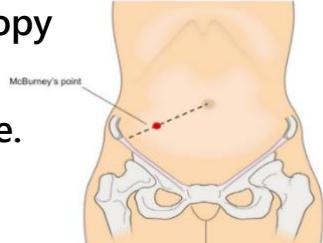
❖ Living anatomy :

Study of anatomy on **livings** by palpation, using hand, inspection using eye & auscultation using stethoscope OR endoscopy as bronchoscopy

❖ Surface anatomy (Topographic) :

study of **deeper** parts of the body in relation to the skin surface.

It's helpful in clinical practice and **surgical** operations.



❖ Radiographic and imaging anatomy :

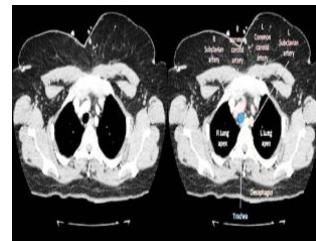
study of the bones and deeper organs by plain and **contrast radiography** by ultrasound and computerised tomographic (CT) scans





❖ **Cross-sectional anatomy :**

- It is the study of the structure and arrangement of the different parts of the body as seen in cross-sections or **slices** of the body.
- It is the essential base in the field of computerized tomography (**CT**-scanning) and Magnetic Resonance Image (**MRI**) technique.

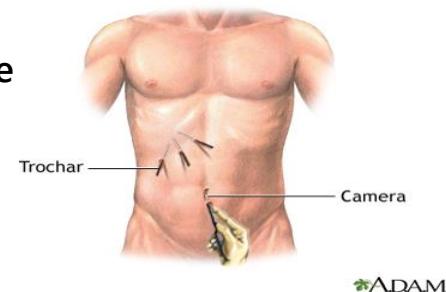


❖ **Applied anatomy (Clinical) :**

Deals with application of the anatomical knowledge to the medical & **surgical** practice.

❖ **Surgical anatomy :**

The anatomy of surgical exposure and **incision**.

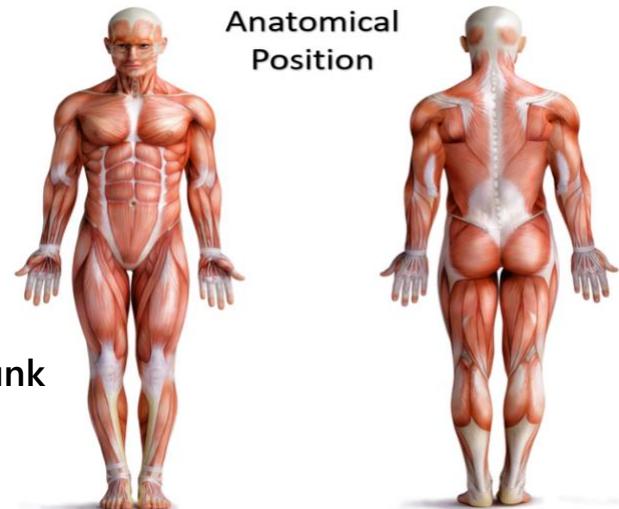


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Anatomical Terms of positions

1- **Anatomical position :**

- It is the standardized method of observing and imaging the body.
- In the anatomical position, the **body** is standing erect the **eyes** looking forwards the **upper limbs** are straight by the sides of the trunk with the **palms** راحة اليد facing forward the **feet** are close together.



2- **Supine position :**

- The body lies down on the back with the face looking **upwards**.

3- **Prone position :**

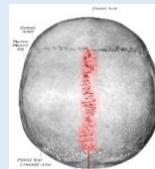
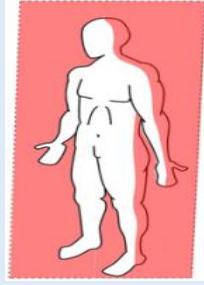
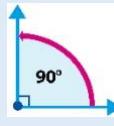
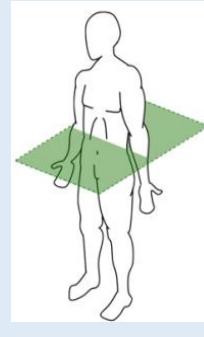
- The body lies down with the face looking **downwards**.

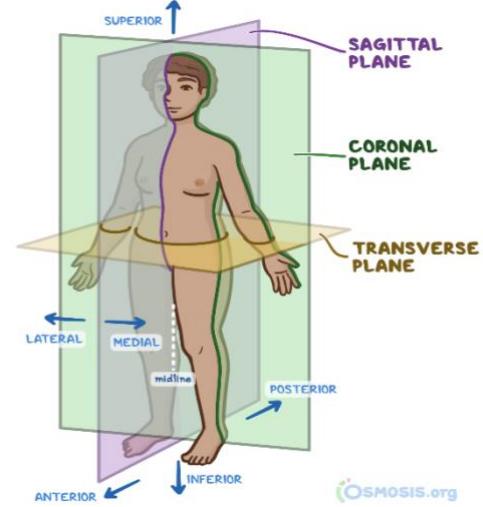
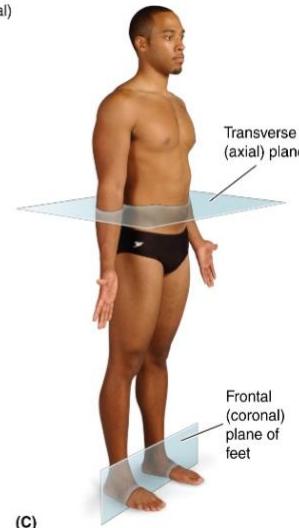
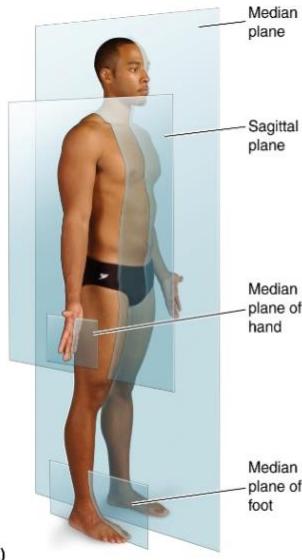




Terms of planes

- Fixed lines of reference along which the body is often divided or sectioned to facilitate viewing of its structures.
- Allow one to obtain a three-dimensional perspective by studying the body from different views.

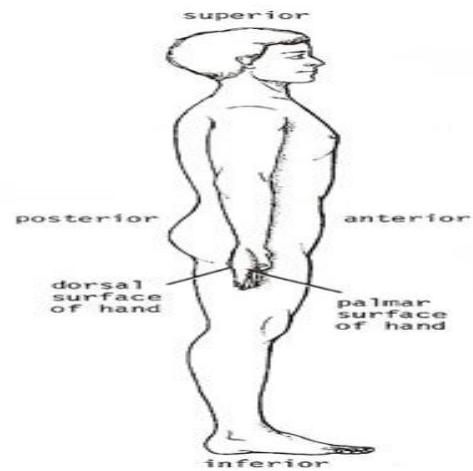
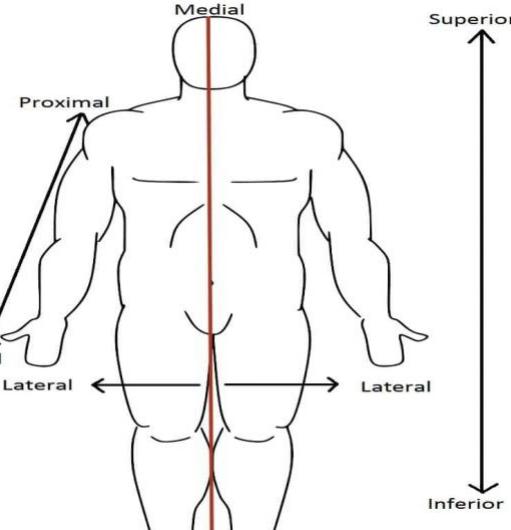
1- Median plane (Midsagittal plane) :	2- The Paramedian sagittal plane:
<ul style="list-style-type: none"> -It is a vertical antero- posterior plane, which divides the body into two equal parts (right and left halves). - It is in the direction of sagittal suture of the skull. 	<p>It is any vertical plane parallel to the median plane.</p>
3- Coronal (Frontal) plane:	4- Transverse (axial) plane:
<ul style="list-style-type: none"> -It is side to side vertical plane, which divides the body into anterior and posterior parts. - It lies at right angles to the median sagittal plane, and in the direction of the coronal suture of the skull. 	<ul style="list-style-type: none"> -It is the plane of cross-sectioning of the body. - It lies at right angles to the vertical planes or the long axis of the part.  





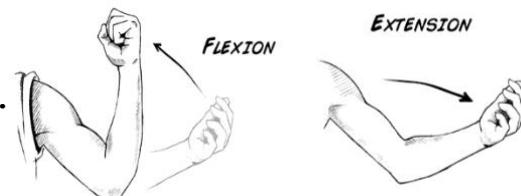
Terms of relations

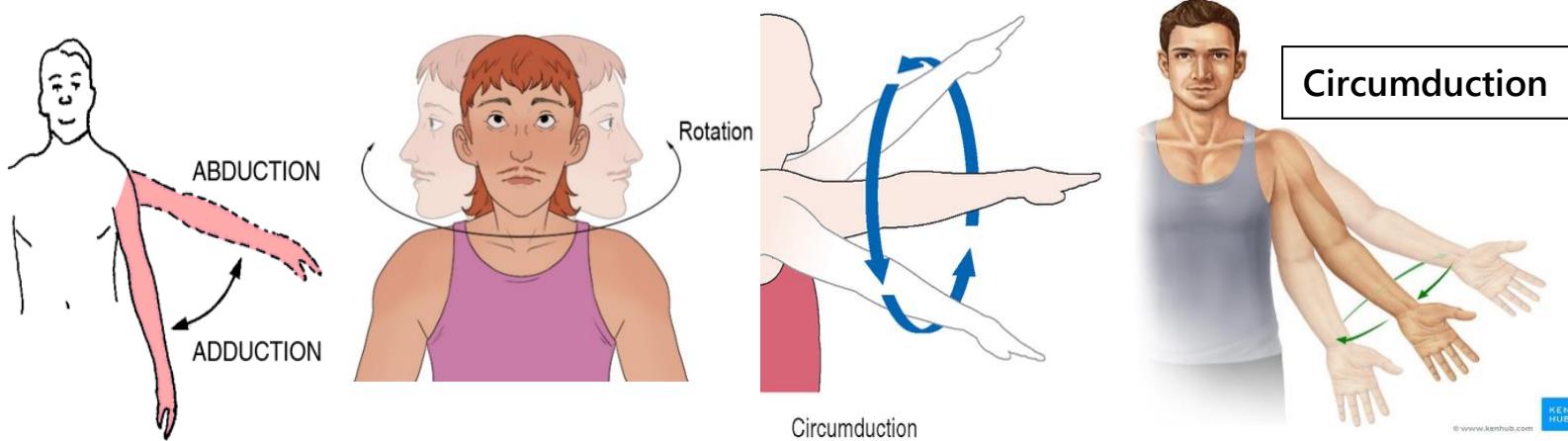
- 1- Right
- 2- Left
- 3- **Anterior** (Ventral): refers to a structure being more in **front** than another structure in the body.
- 4- **Posterior** (Dorsal): refers to a structure being more in **back** than another structure in the body.
- 5- **Superior** (Cranial): Towards the head.
- 6- **Inferior** (caudal): towards the feet.
- 7- **Medial** : The direction towards the median plane.
- 8- **Lateral** : The direction is away from the median plane
- 9- **Proximal** : nearer to the trunk.
- 10- **Distal** : away from the trunk.
- 11- **Superficial** : near the **Surface**.
- 12- **Deep** : further from the surface.



Terms of movements

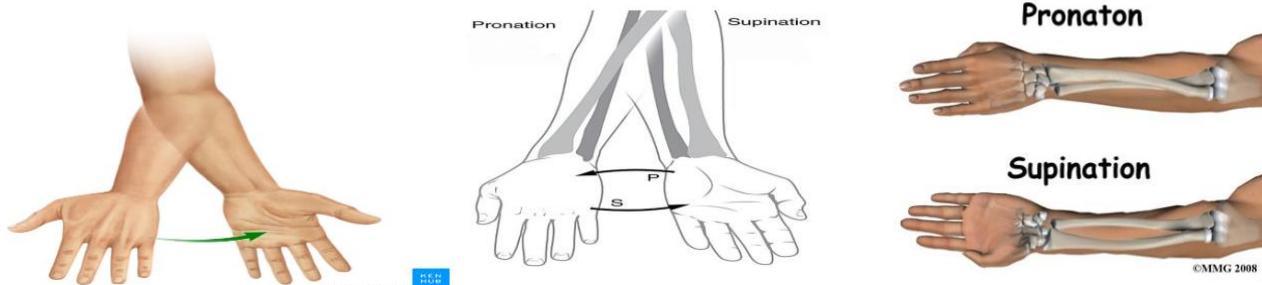
- 1- **Flexion** : It is the angular movement (bending) of a joint .
- 2- **Extension** : It is the act of straightening of part or limb.
- 3- **Adduction** : It is the movement of the limb **towards** the median plane.
- 4- **Abduction** : It is the movement **away from** the median plane.
- 5- **Rotation** : It is the turning movement of the body or part around its **long axis**.
Rotation can be medial or inward and lateral or outward rotation.
- 6- **Circumduction** : It is the movement of the limb, in a **circular** direction.
It occurs by the **succession** of adduction, abduction, flexion, extension and rotation movements.





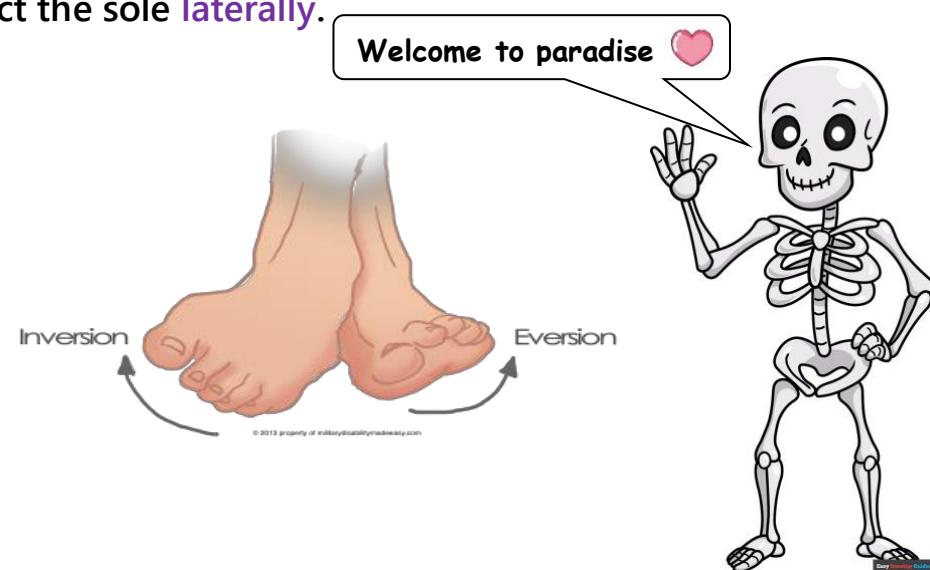
7- **Supination** : It is the rotation of the forearm to direct the palm **forwards** .

8- **Pronation** : It is the rotation of the forearm to direct the palm of the hand **backwards**.



9- **Inversion** : It is the turning inwards of the foot with elevation of its inner margin; to direct the sole **medially**.

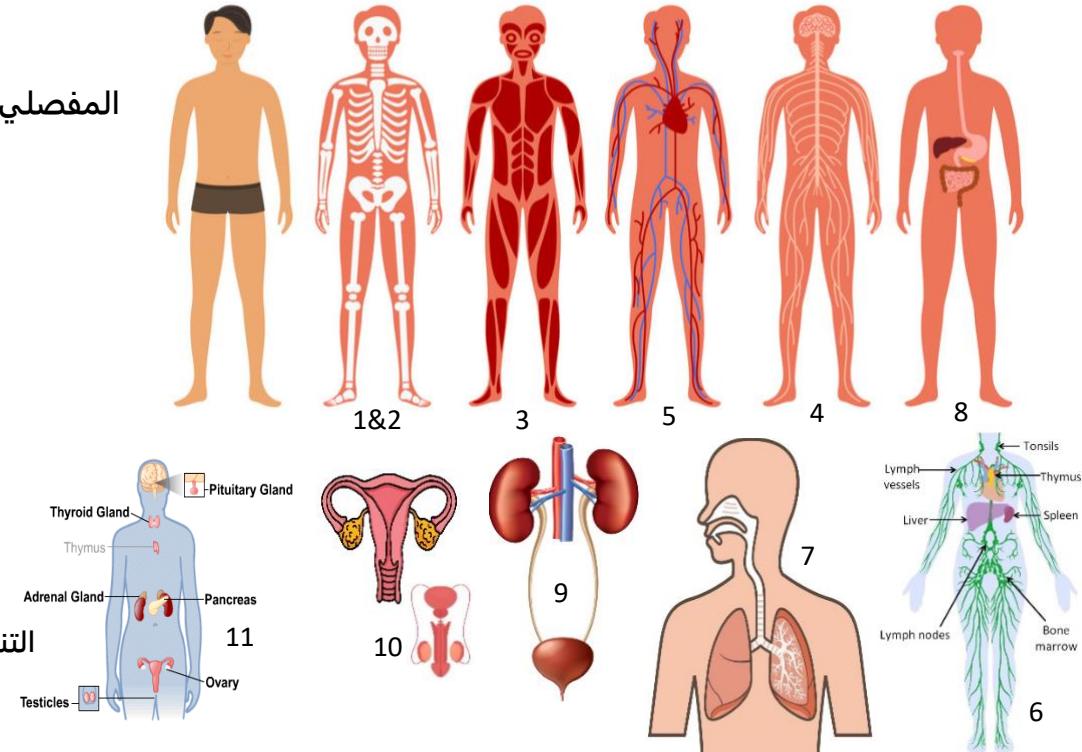
10- **Eversion** : It is the turning outwards of the foot with elevation of its outer (external) margin, to direct the sole **laterally**.





Different body systems

- 1- Skeletal system العظمي
- 2- Articulating system (joints) المفصلية (joints)
- 3- Muscular system العضلي
- 4- Nervous system العصبي
- 5- Circulatory system الدوري
- 6- Lymphatic system الليمفاوي
- 7- Respiratory system التنفسي
- 8- Digestive system الهضمي
- 9- Urinary system البولي
- 10- Reproductive system التناسلي
- 11- Glands الغدد
- 12- Special sense organs as eye ,ear, nose. أعضاء الحواس الخاصة.



What is the plane that divides the body into anterior and posterior parts ?

- | | |
|----------------------|-----------------------------|
| 1- midsagittal plane | 2- coronal plane |
| 3- transvers plane | 4- paramedian sagital plane |

سيك من أي حد يقولك
إن التقديرات والشهادة
مالصومش لازمة.

Which is the movement that rotate the foot and direct the sole laterally?

- | | |
|--------------|---------------|
| 1- Eversion | 2- Pronation |
| 3- Inversion | 4- Supination |



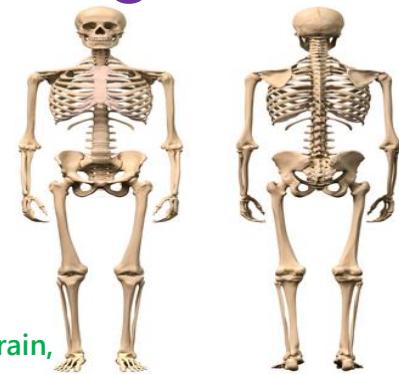


L2&3 Anatomy : Bones and Cartilages

1- Bones

Functions of the bones:-

- 1- They give the body its **shape**
- 2- Skeletal muscles **attached** to the bone for movements.
- 3- **Protect** some important organs. For example, the skull protects the brain, the thoracic cage protects the heart and lungs, and the spine protects the spinal cord.
- 4-The **bone marrow** inside the bone is used for the production of blood cells
- 5-The bone is considered as a **store** house of salt calcium and phosphorus



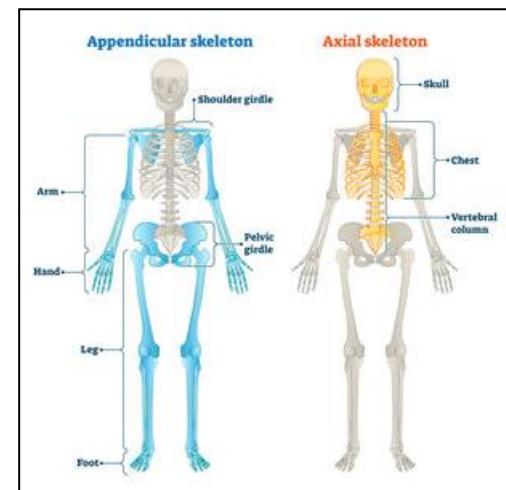
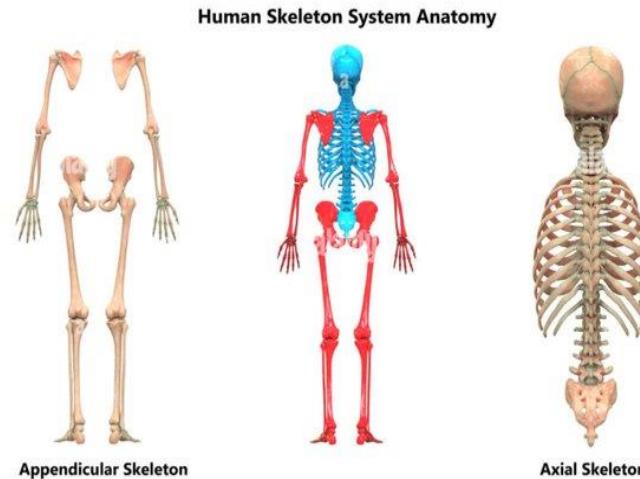
Classifications of bones

- The bones are classified according to:
- A-Regional position
- B- Morphology (shape)
- C-Structure
- D-Development

1-Regional classification حسب المكان

according to the **position** of bones (axial bones & appendicular bones)

(1) Axial skeleton	(2) Appendicular skeleton
- Skull العمود الفقاري الجمجمة	- Vertebrae العظام القحفية
- ribs عظام القص الصلوة	- Sternum عظمة الصدر





2-Developmental classification

A-Membranous bones: It is the bone developed from a connective tissue membrane, by **intramembranous ossification**.

Examples: Bones in the skull cap as frontal bone, parietal bone.

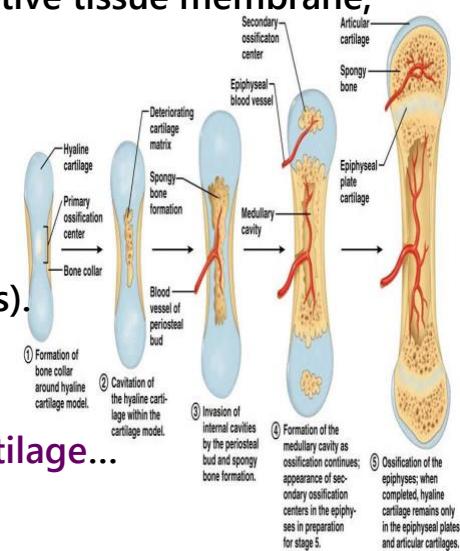
B-Cartilaginous bones: The bones developed by ossification in a models Of hyaline cartilage by cartilaginous ossification.

Examples: Appendicular bones (bones of upper and lower limbs).

C-Bones of mixed ossification

It is the bones which ossify partly in membrane & partly in cartilage... i.e. membrano – cartilaginous bones.

Examples: **Mandible**

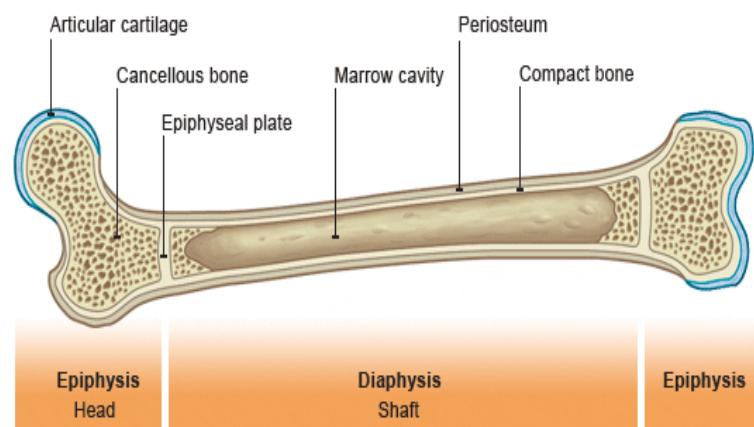
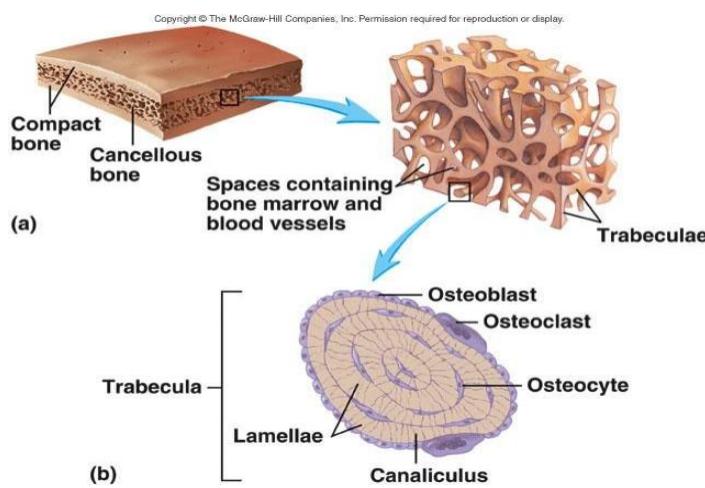


3-Structural classification

1- Compact bone: It is the **hard**, ivory like bone, which forms the cortical covering of all types of bone. It is well developed and thick in long bones, particularly at the middle of shafts, **to resist the bending and twisting**.

2- Cancellous (spongy or trabecular) bone: It is formed of a **trabecular meshwork**, containing spaces filled with bone marrow.

Present in the ends of long bones and the interior of all other types of bone. Cancellous bone is always covered by an outer shell of compact bone.





2-Morphological classification: حسب الشكل

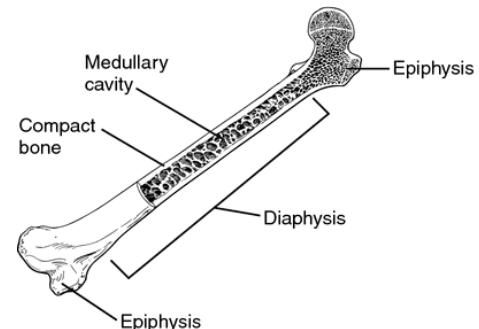
A-Long bone:

➤ Typical Long Bones:

It is the bone having an elongated shaft (body or diaphysis), which extends between two expanded smooth, and articular ends (epiphyses).

* The shaft contains medullary cavity filled with bone marrow.

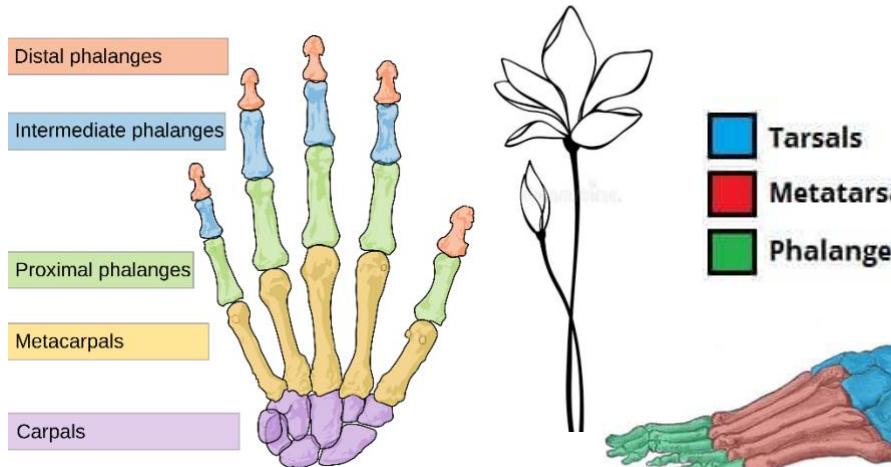
Examples: femur, tibia, humerus, radius الكعبرة العضد القصبة، الفخذ، العضد، الرسغ، الترقوة



➤ Atypical long bones:

* having only one epiphysis known as small long bones. e.g. metacarpals

* without a medullary cavity e.g. clavicle الترقوة

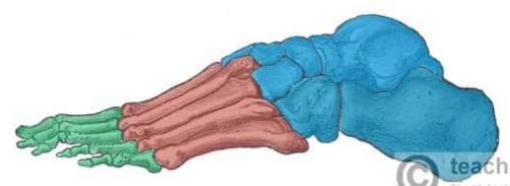


B-Short bones:

The bones which are usually cubical, مكعب (cubic) or scaphoidal, زورقي (shaped like a boat) in shape.

Examples: carpal bones of hand and tarsal bones of foot.

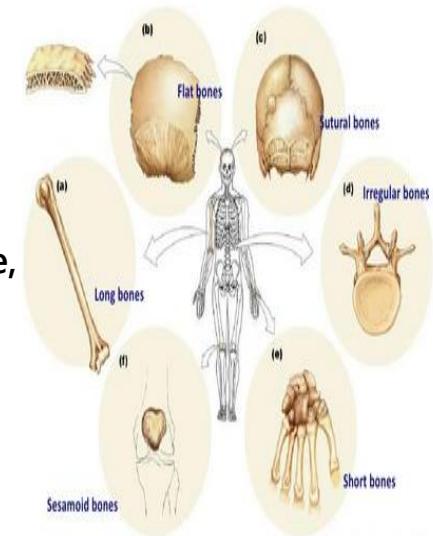
ازبك يا دكتور ❤️
تعرف تحدي في الصور دي
مين ؟ short bone atypical long bones



C-Flat bones:

They are formed of an outer and inner lamina of compact bone, separated by a layer of spongy bone in adult.

Examples: bones of vault of skull, sternum, ribs



D-Irregular bones:-

The bones which are not long, short or flat

Examples: Vertebrae





E-Pneumatic bones: (يعني هواء) (Pneumo)

the bones containing large air spaces as maxilla in the skull

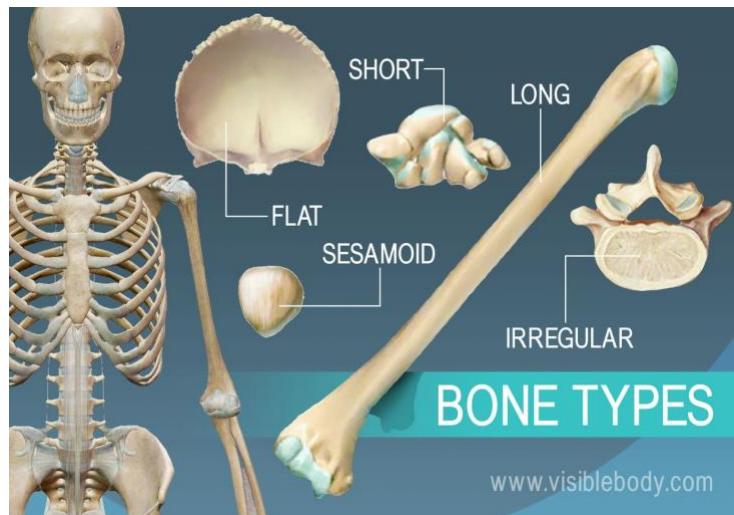
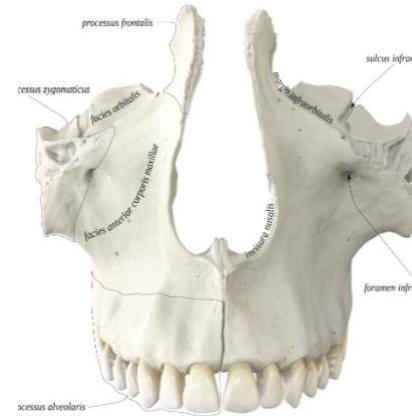
الذي اسم عظمة من عظام الجمجمة، وفي جيب هوائي باسمها أصلًا

F-Sesamoid bones:-

The bony nodules embedded in the tendons, ligaments.

-Have no periosteum

Examples: Patella عظمة الصابونة (الرثبة)

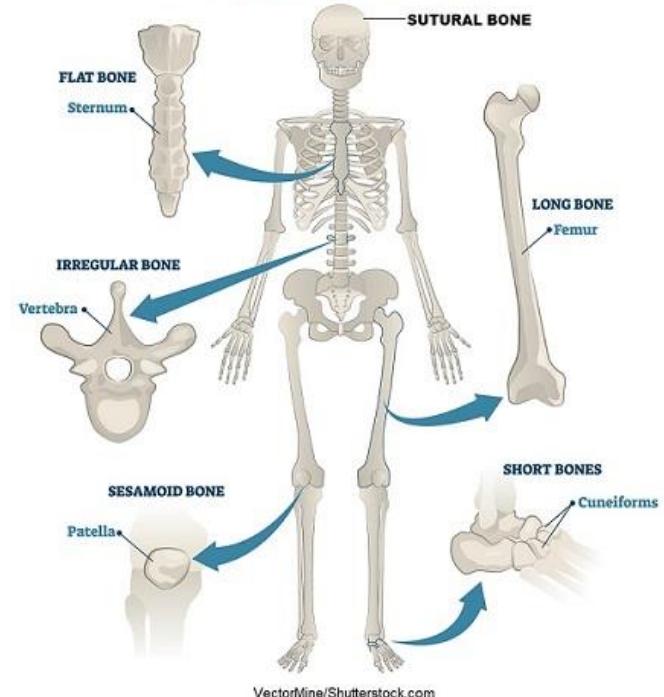


Morphological



The sternum is

TYPES OF BONES



1- flat membranous bone

2- irregular cartilaginous bone

3- long cartilaginous bone

4- flat cartilaginous bone



Structure of the living long bones

Epiphysis: end of long bone.

Diaphysis: shaft of long bone.

Epiphyseal plate of cartilage: In growing bone plate of hyaline cartilage between epiphysis & metaphysis. Responsible for **growth of length**.

Metaphysis: part of diaphysis in close contact with the epiphyseal plate of cartilage

- The shaft (diaphysis) is formed of:

Periosteum:

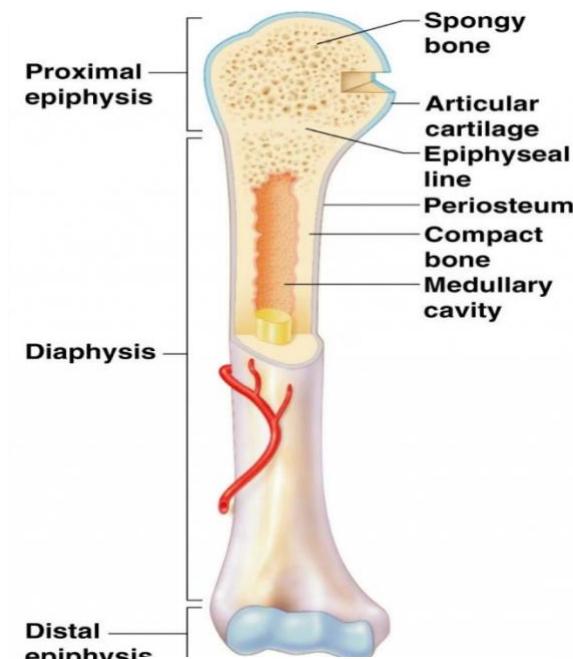
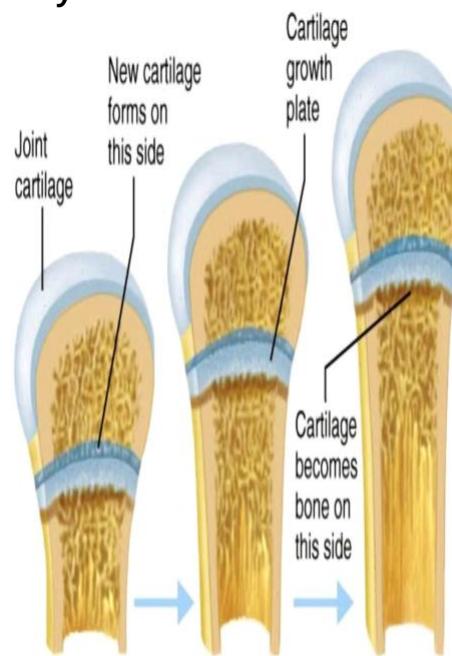
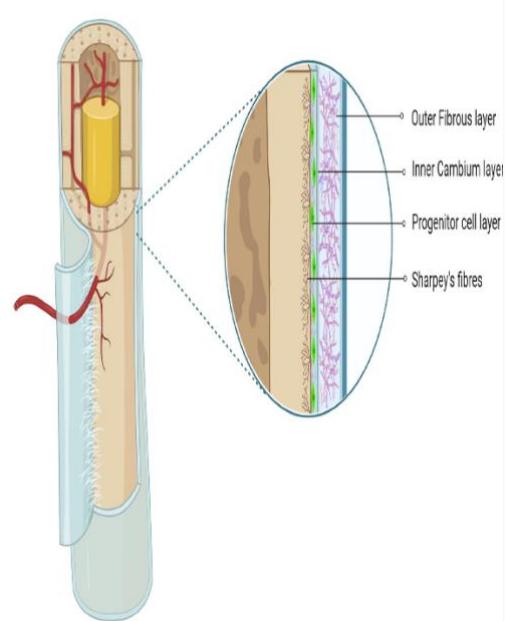
It is outer cover of the shaft.

Important in growth of bone in thickness, innervation and nourishment

Cortex of compact bone

Medullary cavity: It is only found in long bones except clavicle and is filled with red or yellow bone marrow.

Bone marrow



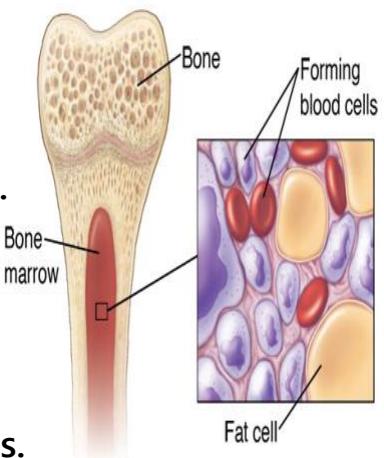
Bone marrow:

1-Red bone marrow:

- Its function is to form the various **blood cells** and is found in the flat bones, the vertebrae and the skull and it lasts for life.
- It is also found in the long bones in early age but is **replaced** by the yellow bone marrow at puberty

2-Yellow bone marrow :

It is a **fatty** tissue has **no** role in the formation of red blood cells.





Blood supply of bones

Arterial supply of long bones:

Nutrient, periosteal, metaphyseal and epiphyseal arteries.



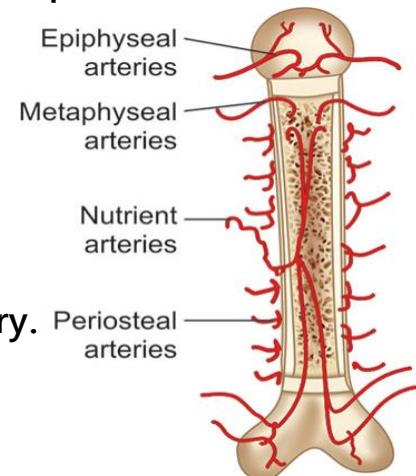
1- Nutrient artery:

It supplies the:

- medullary cavity .
- deeper 2/3 of the compact cortex of the shaft , it divides into proximal.

2- Periosteal arteries:

- arteries for attached periosteum.
- supply the outer 1/3 of the bone cortex.



3-Metaphyseal arteries:

- they supply metaphysis and anastomosis with nutrient artery.

4-Epiphyseal arteries:

- arise from the articular artery.
- they enter the epiphysis through multiple foramina at the end of the shaft.

Venous

Venous drainage:-

The veins accompany the arteries, and are relatively small

Lymphatic vessels:-

They accompany the periosteal vessels to the regional lymph nodes.

Nerve supply of bones:

- a- Sensory fibers.
- b- Vasomotor sympathetic.



————— ♥ ♥ ♥ —————

Which of the following arteries supply the outer 1/3 of the bone cortex?

- | | |
|-----------------------|----------------------|
| 1- nutrient artery | 2- periostial artery |
| 3- metaphyseal artery | 4- epiphyseal artery |



2- Cartilage

Cartilage is a firm, rubber-like part of the skeleton.

General features of cartilage:-

- 1- non-vascular structure i.e. it has no vessels. ميش عنده دم
- 2- It is insensitive.
- 3- covered on its surface by perichondrium.
- 4-Calcification of cartilage, occurs when it is replaced by bone.
- 5-It is a radiolucent بيهدر أسود في الأشعة

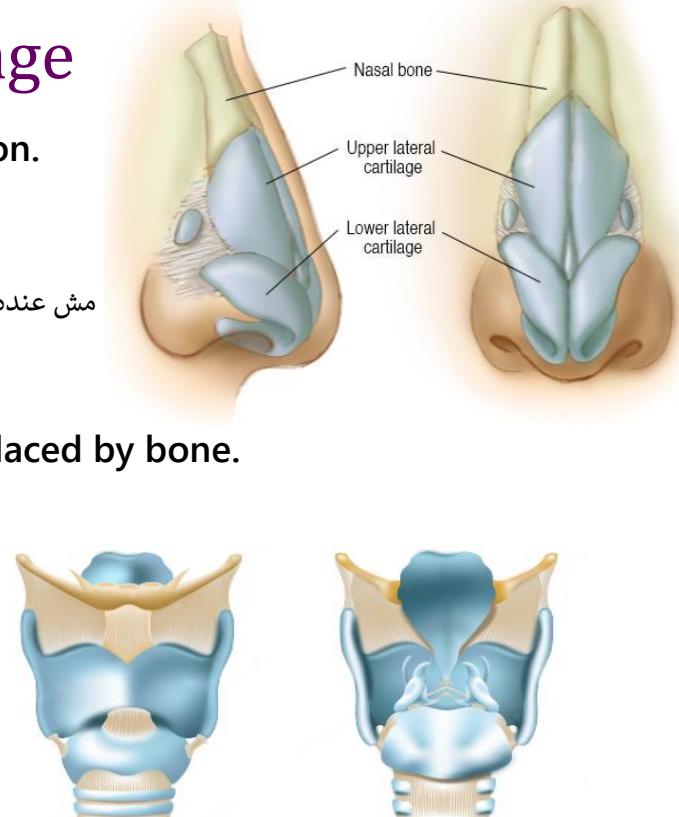
Classification of cartilage:-

1- Hyaline cartilage:

-It is homogenous, bluish white in colour and translucent

♡ In respiratory system:-

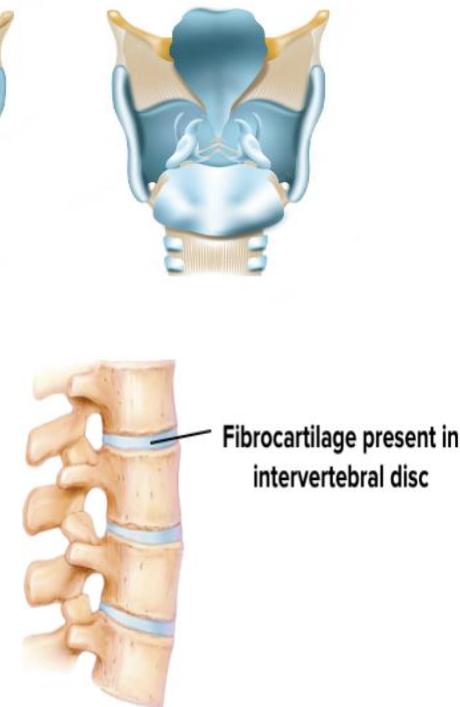
Nasal cartilages, Larynx and trachea and bronchi. الجهاز التنفسي



2- White fibrocartilage:

- it is the cartilage rich in white collagenous fibers, which are responsible for its white colour and opaque معتم appearance.
- It is resilient, strong, and tough, and is usually found in places subjected to great pressure.

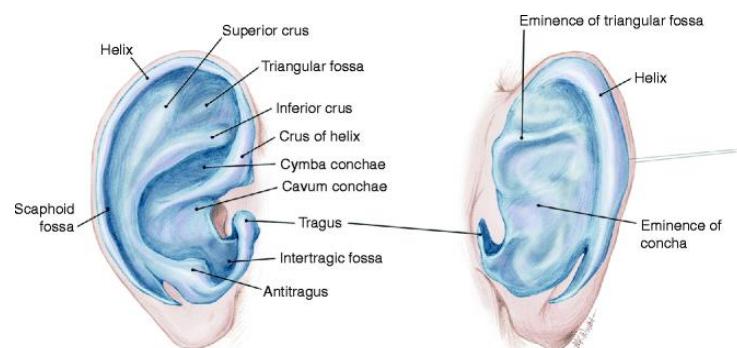
Examples :- Intervertebral discs (IVD) . القرص بين الفقرات .



3- Yellow elastic fibrocartilage:

-It is the cartilage rich in yellow elastic fibers which make it more flexible.

- Examples:- External ear الأذن الخارجية



﴿لَقَدْ خَلَقْنَا الْإِنْسَانَ فِي أَحْسَنِ تَقْوِيمٍ﴾
في أعدل خلق، وأحسن صورة



Anatomy L4 : Muscle

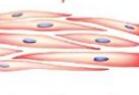
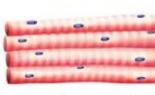
The muscle is a group of contractile fibers, responsible for the movements of the different parts of the body

Types of muscles : (site, shape, innervation) **Types of Muscle**

1) Smooth or visceral muscles



2) Cardiac muscle



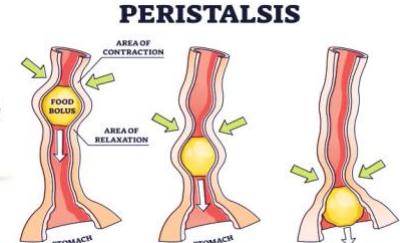
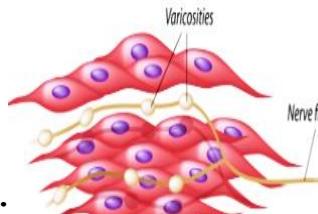
3) Skeletal muscles



Visceral muscle

They are also named smooth, plain, **non-striated** and **involuntary**

- Present in **viscera**.



- They are arranged in thin sheets connected together by **areolar tissue** not branches.

- It is involuntarily... Innervated by **autonomic** nerves.

Cardiac muscle



- The cardiac muscle forms the **myocardium** of the heart.

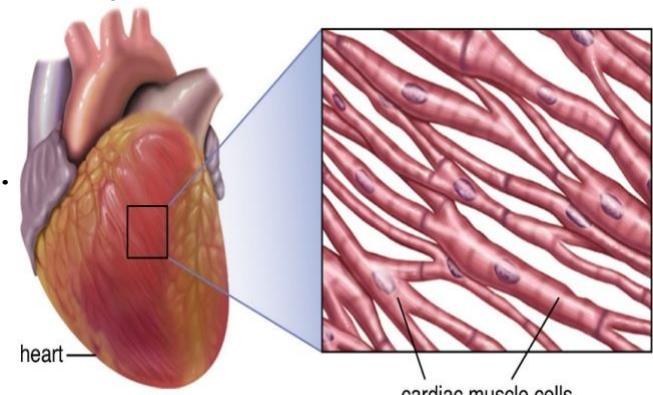
- The muscle fiber is formed by a numerous muscle cells joined together at the **intercalated discs** .

- Each muscle cell contains a single, centrally placed nucleus and shows, less marked striations.

- The muscle fiber is branched.

- It is **involuntary**.

- innervated by the **autonomic** nerves, and is controlled also by a **Special conduction system** located in the myocardium for this reason it can acts automatically away from its innervation.





Skeletal muscles

-Skeletal muscle is attached to the skeleton.

They also named somatic, striated and voluntary

Characters of the skeletal muscles :

- Weight : 40-45%

- Muscle fibers :

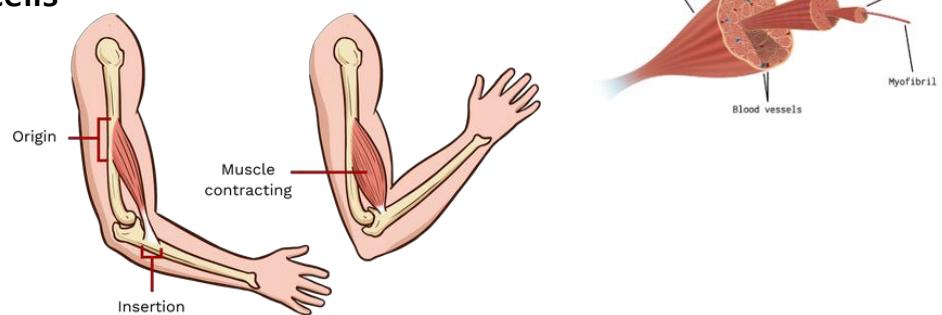
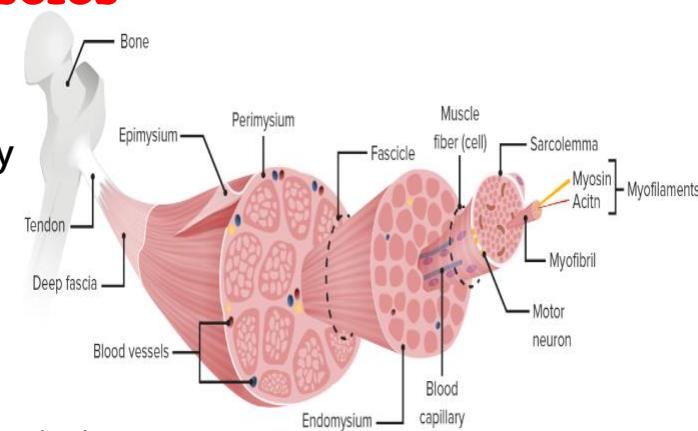
Each muscle fiber is not branched with marked striation and peripheral multinucleated cells

- The muscle is voluntary.

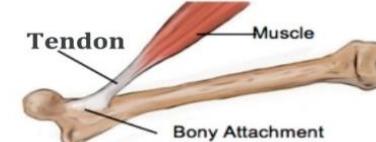
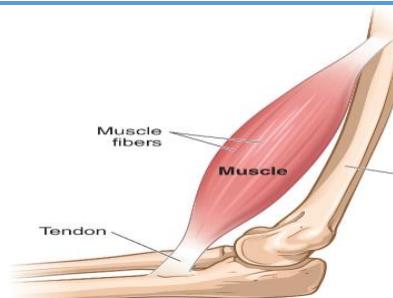
- innervated by **somatic** nerves.

❖ Parts of skeletal muscle :

The skeletal muscle consists of



Origin	Insertion
<ul style="list-style-type: none"> - It is the less mobile end of the muscle during its contraction. - In limb muscles it is usually the proximal end. 	<ul style="list-style-type: none"> - It is the more mobile end of the muscle, and is usually the distal end in the limb muscles, and is mostly tendinous.
Fleshy part (Muscle belly)	Muscle tendon
Muscle belly is the fleshy, contractile part of the muscle, between its two ends.	<p>It is the non-contractile, fibrous, flat or cord- like part of the muscle.</p> <p>The muscle tendon is usually found at its two ends , tendon of origin and tendon of insertion.</p>





Skeletal muscles arranged in functional groups :

→ Ventral muscles are flexors, except in lower limb.

→ Dorsal muscles are extensors except in the lower limb.

→ Lateral muscles are abductors.

→ Medial muscles are adductors.



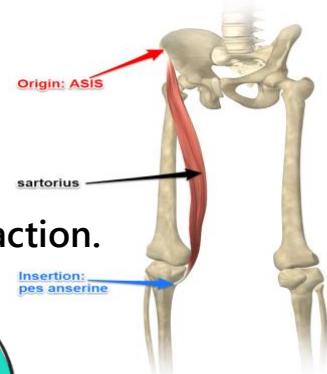
❖ Arrangement of muscle fibers :

A- Fibers parallel to the line of pull :

The fibers are longer and fewer in number than in the oblique type.

They provide a **greater range** of movement, with **less force** of contraction.

example: Sartorius



B- Fibers oblique to the line of pull :

- These muscle fibers are called pennate muscles (feather – Like).
- The muscle fibers are shorter and numerous than in the parallel type.
- This arrangement makes the muscle contraction **more powerful**, but with a **narrow range** of movement.

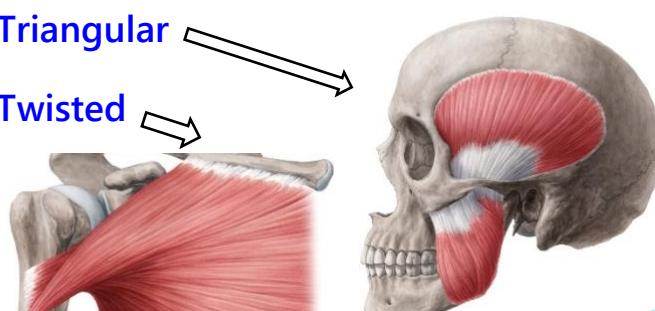


❖ Forms of Oblique fibers

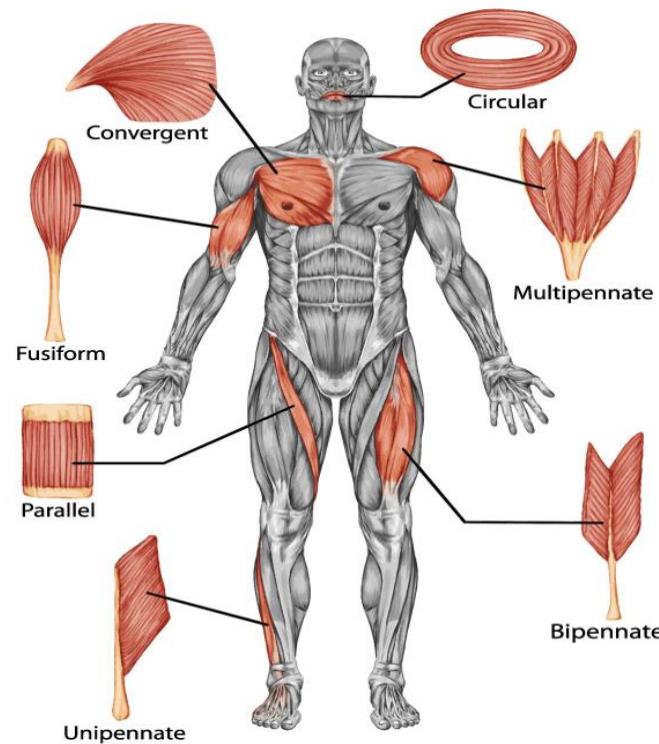
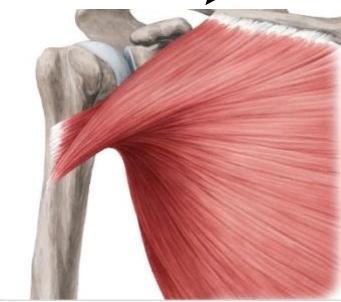
1) Pennate :

- | | |
|-----------------|------------------|
| a- unipennate | b- Bipennate |
| c- Multipennate | d- Circumpennate |

2) Triangular



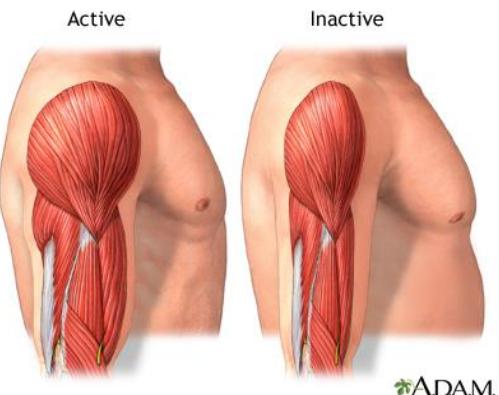
3) Twisted





Muscle tone :

it is a characteristic **firmness** of muscle during rest,
it lost after injury of motor nerve supply of the muscle,
the muscle become **flaccid**.

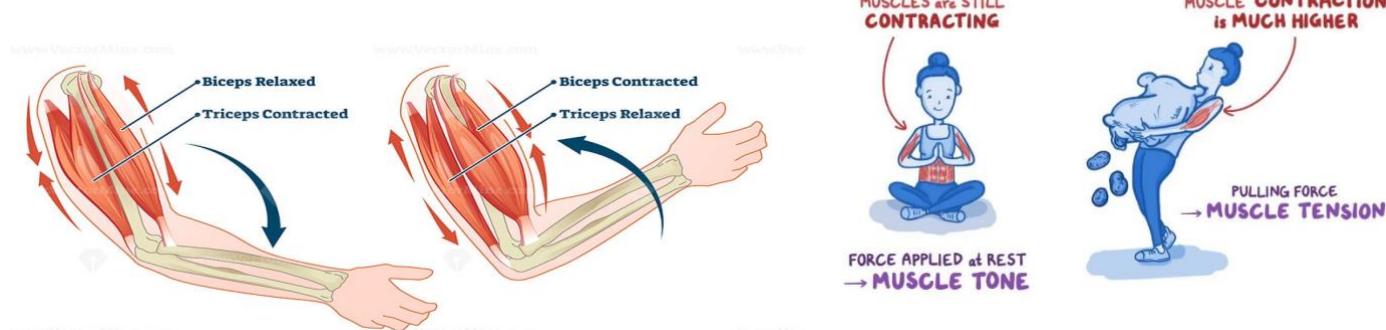


©ADAM.

Muscle actions "functions"

makes it **shorter** in length to bring its attachments closer to each other.

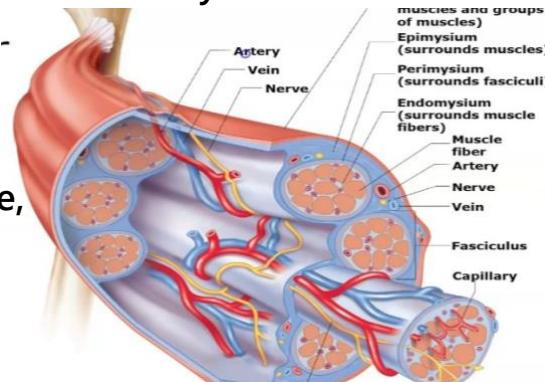
HOW DO MUSCLES WORK



Blood supply : - The muscle receives Muscular branch from the nearby arteries

Nerve supply :-

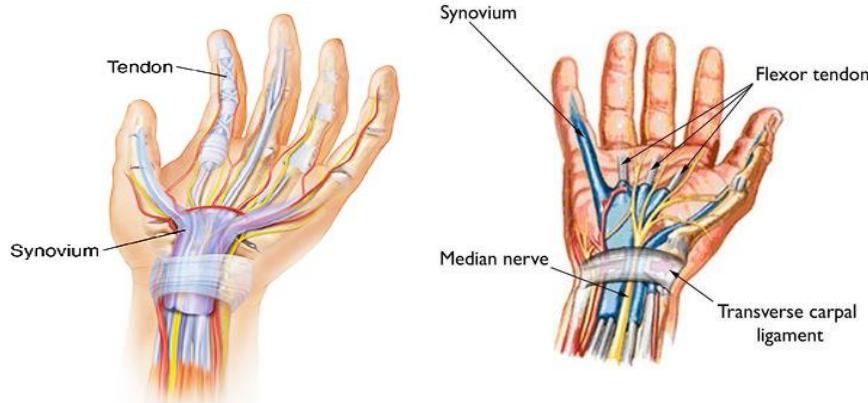
The somatic muscle receives its nerve supply along with its arterial supply which is usually through its deep surface, to avoid the external nerve injury.



❖ Synovial sheath

is one of the two membranes of a tendon sheath which covers a tendon

This helps to **reduce friction** between the bones and allows free movement



رُوقْ يَا قَمْر..
إن شاء الله بكرة أحلى



زنغاليں



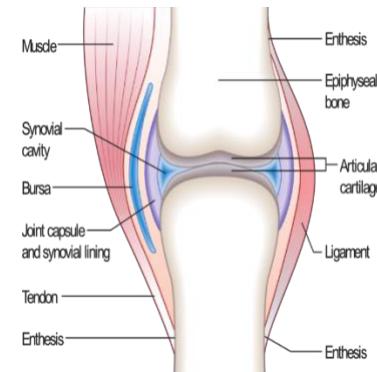
Anatomy L5 : Joints

- Joint is the site of **meeting** between two or more bones.

❖ Classification of joints : Structural & functional

A- Structural types :

"According to the **connecting tissue**"



1- Fibrous joints المفاصل الليفية	2- Cartilagenous joints المفاصل الغضروفية	3- Synovial joints المفاصل الزلالية
<p>As sutures in skull And inferior tibio-fibular joint</p>	<p>a- Hyaline cartilage : - primary cartilaginous joints. - as metaphyseal-epiphyseal junction.</p> <p>b- Fibrocartilage : - secondary cartilaginous joint. - as IVD.</p>	

B- Functional types

"Based on the range of movements."

1- Immobile joints	2- Slightly mobile	3- Freely mobile
<p>a- Fibrous: as sutures</p> <p>b- Hyaline cartilaginous joints:- as joint at the metaphyseal-epiphyseal junction which disappear by ossification of epiphyseal cartilage</p>	<p>Fibrous: inferior tibiofibular joint.</p> <p>Fibrocartilage: as intervertebral disc (IVD)</p>	<p>As synovial joints.</p>



Which of the following joints is a secondary cartilaginous joint?

- 1- elbow joint
- 2- sutures
- 3- intervertebral disc
- 4- wrist joint

Synovial Joints

❖ Characters of synovial joints :

1- Regular Joint Cavity :

It lies between the articulating bones .

2- Articular Cartilage :

- The Joint surface of the articulating bones are covered with a hyaline articular cartilage.
- The hyaline articular cartilage is not visible in x-ray.

3- Fibrous Capsule :

It is attached to and holding the articulating bones.

4- Synovial Membrane & Fluid :

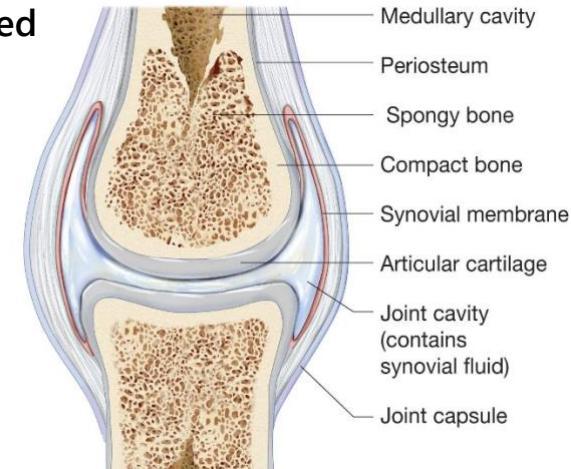
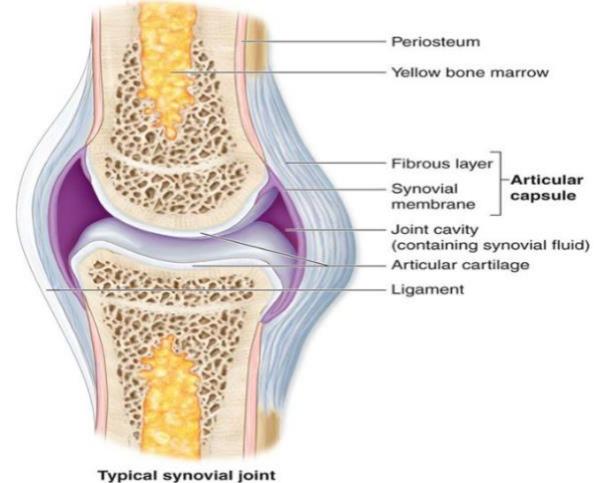
- The articular capsule is lined by synovial membrane, which also covers all of the intracapsular structures, Except the articular cartilage.
- Synovial membrane secretes the synovial fluid السائل الزليلي, which lubricates and fills the joint cavity.

5- Intracapsular Structures :

- Articular cartilages ,synovial Membrane.
- Synovial fluid and other structures: as menisci, muscle, Tendon وتر and ligaments أربطة

6- Free Mobility :

The synovial joints allow variable degrees of different movements.



Do something today that your future self will thank you for.





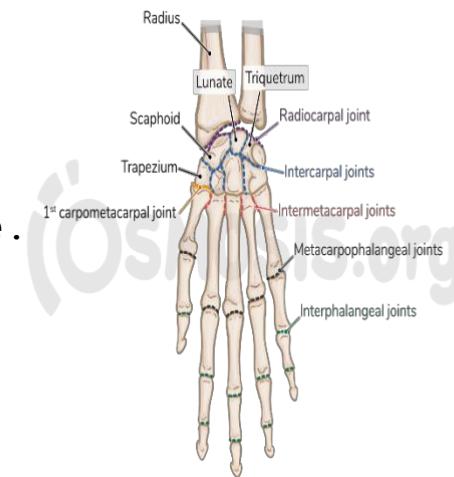
❖ Classification of synovial joints :

According to the **shape** of the articulating surfaces and the possible **movements**.

1- Plane Joints :

- These joints are between a flat articular surfaces.
- The possible movements are sliding or gliding, which occur in variable directions but within a limited range .

Examples: intercarpal joint



2- Uniaxial Joints :

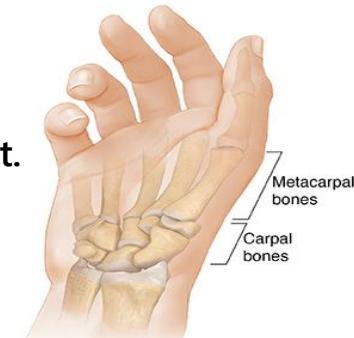
- Their movements occur around **one** axis.

a- Hinge joints	b- Pivot joints
<ul style="list-style-type: none"> - which move around a transverse axis . - The movement is Flexion-Extension. As elbow joint الكوع and ankle joint الكاحل. 	<ul style="list-style-type: none"> - which move around a vertical or longitudinal Axis - The movement is only rotation as superior and inferior radioulnar joints.

3- Biaxial Joints :

Their movements occur around **two** axes:

- An antero-posterior axis, with an Adduction-Abduction movement.
- A transverse axis, with a flexion-extension

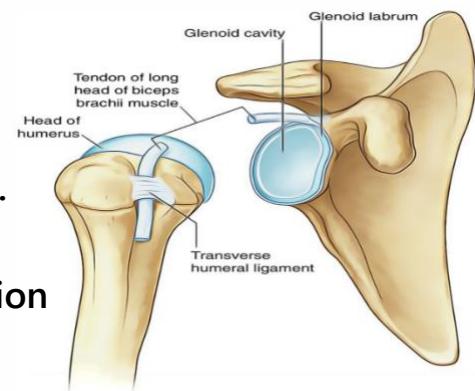


Examples:

- a- Ellipsoid as wrist joint.
- b- Saddle joints as carpometacarpal joint of the thumb.

4- Polyaxial Joints :

- In which the movements occur around **more than two axes**.
- A longitudinal, transverse and antero-posterior axes.
- Their possible movements include: rotation, flexion-extension and adduction –abduction movements .



Examples: Ball and Socket تجويف joints as shoulder joint and hip joint.

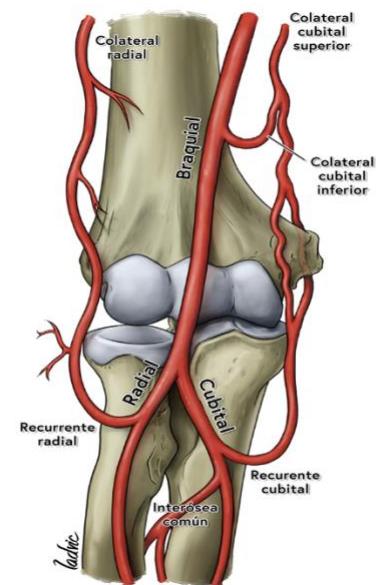
Which of the following joints is ellipsoid joint?

- 1- elbow joint 2- radio-ulnar joint 3- hip joint 4- wrist joint



Nerve supply of joints

- 1- The capsule and its close ligaments are **richly innervated** and contain pain and stretch receptors.
- 2- Synovial membrane is relatively **less innervated**.
- 3- Blood vessels, are controlled by **autonomic nerves**.
- 4- Articular cartilage is **not sensitive**.



Blood supply of joints

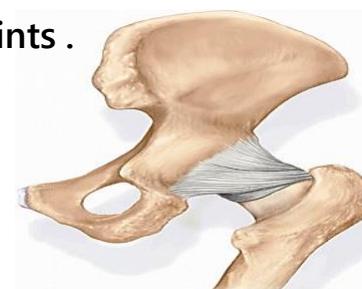
- Collectively the joint receives numerous articular branches from the main near vessels.
- Anastomosis around joints in general, but particularly in limbs, to overcome the effect of joint bending on the blood flow in these vessels.
- articular branches penetrate the capsule to form a capillary plexus in the synovial membrane.

Stability of joints

-There are specific factors, needed for the support and protection of joints.

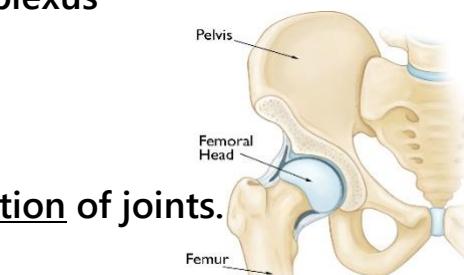
A- Bone factor :

- It depends on the shape, size and fitting of the articulating bony surfaces .
- This is evident in hip and ankle joints .



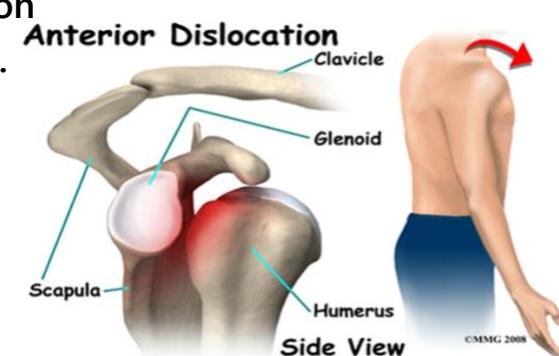
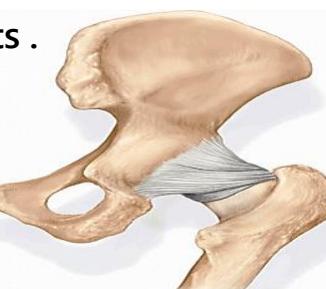
B- Ligamentous factor :

- It is a common factor in all joints.



C- Muscular factor :

- The tone of muscles and the force of their contraction are major factors in protection and support of joints.
- Muscle factor is of great importance in certain joints as shoulder, knee, and hip joints.



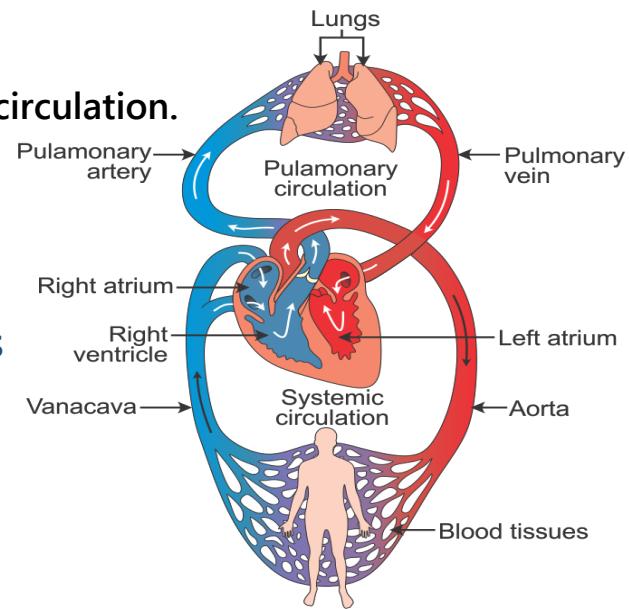
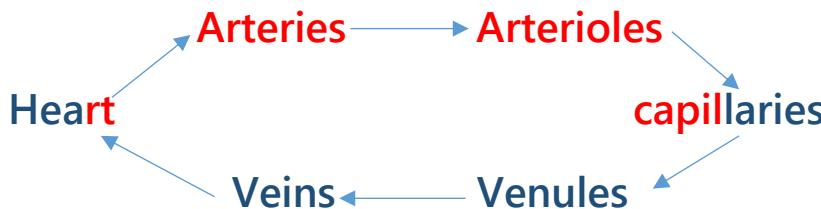


L6 : Blood vessels

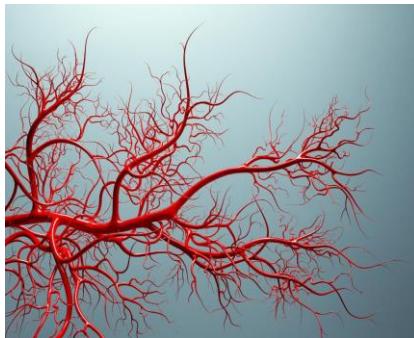
Blood circulation:

Blood moves inside a closed circle called blood circulation.

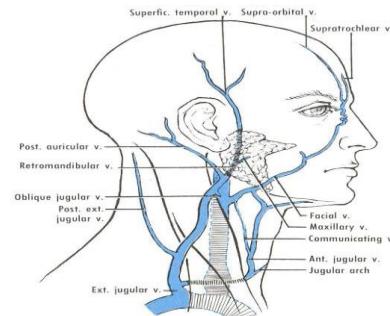
This circle consists in sequence of:



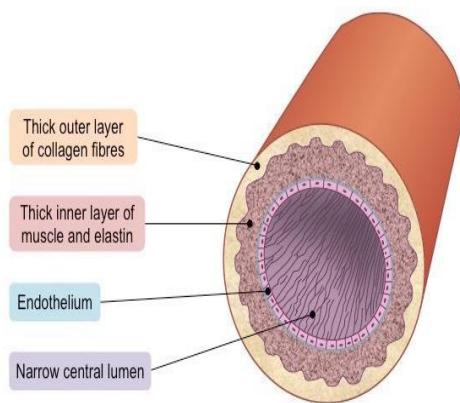
Arteries	Veins
Distributing vessels, which carry the blood from the heart to all parts of the body	Draining vessels that carry the blood from the body to the heart
They branch and re-branch in a tree-like manner.	a river-like manner, to the heart.
The lumen is generally small	Lumen is relatively large
The wall is generally thick	Wall is relatively thin
Carry oxygenated blood, <u>Except</u> the pulmonary and umbilical arteries which carry a non-oxygenated	All veins carry non – oxygenated blood, <u>Except</u> the pulmonary and umbilical veins.
Bleeding from an injured artery is projectile (bright red)	bleeding from an injured vein is in a continuous stream (dark blood)
deep course	Superficial & deep course in the body
Valveless	contain valves in their lumen in limbs
Pulsating	Not pulsating



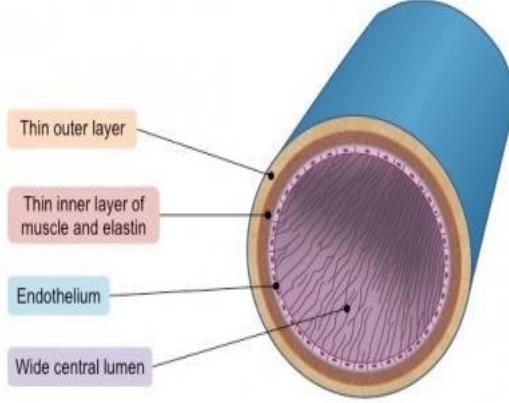
tree-like manner.



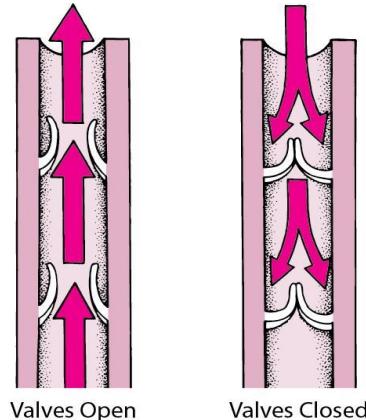
river-like manner



Arterial wall

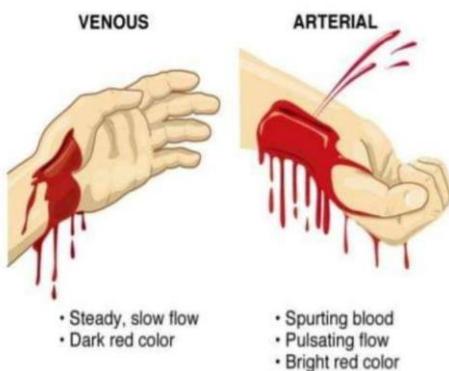


Venous wall

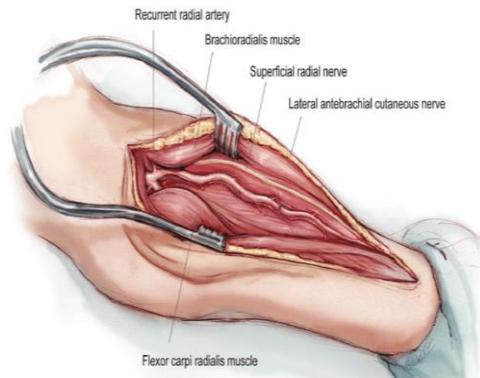


Valves Open

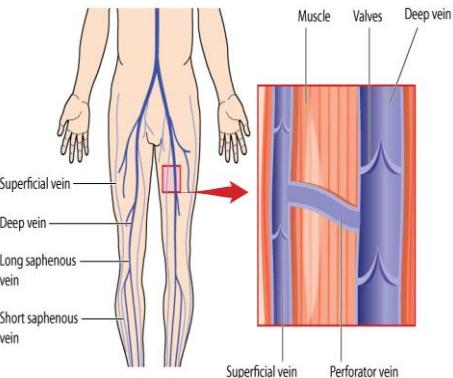
Valves Closed



Venous vs Arterial bleeding



Deep Arteries



Superficial & deep veins

MCQ: The vein is a blood vessel characterized by:

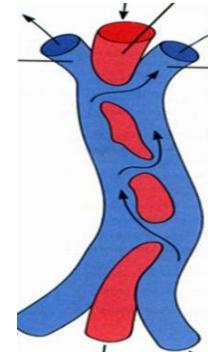
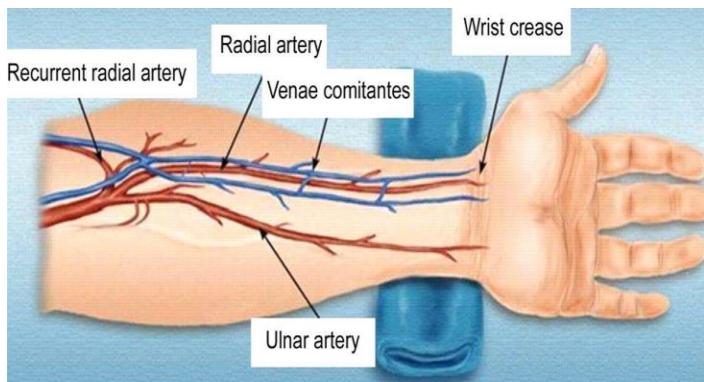
- A. Has tributaries B. Has oxygenated blood
- C. Thick wall D. Narrow lumen
- D. Projectile bleeding

Answer: a



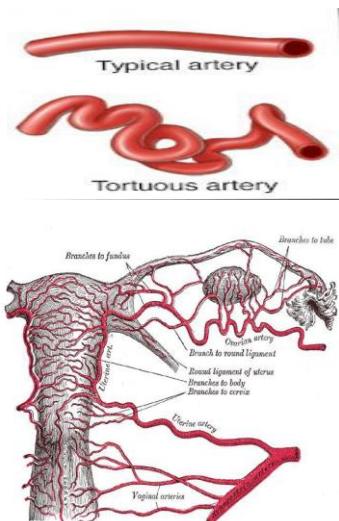
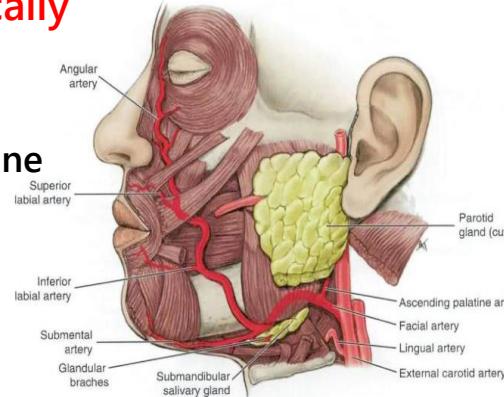
Veneae comitantes

- Paired veins accompany the arteries in **the distal parts of limbs**.
- The pulsations of the artery aid venous return and heating venous blood.



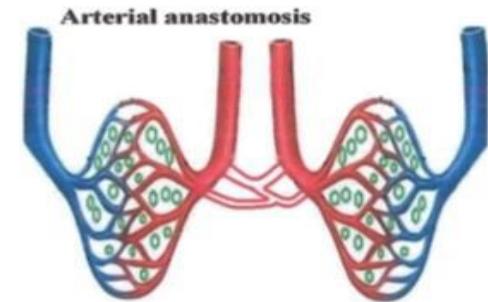
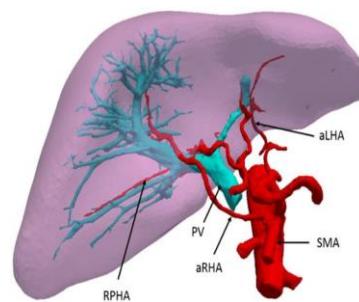
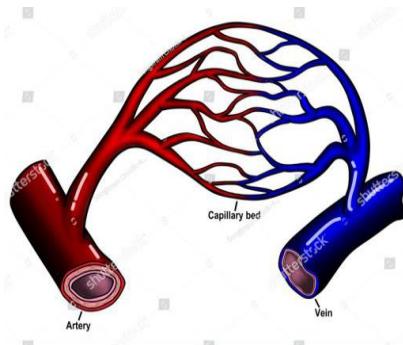
Types of arteries Morphologically

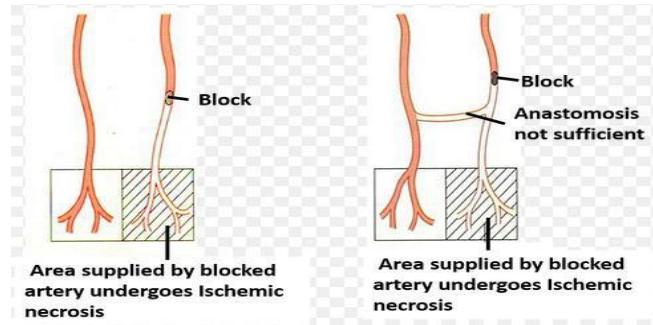
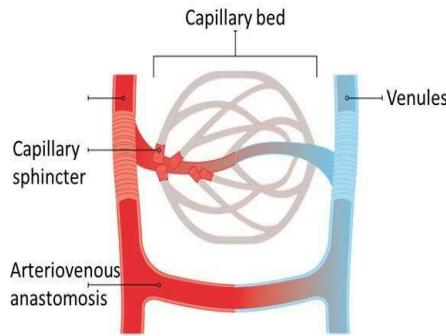
- Straight arteries: Most arteries
- Tortuous arteries: e.g; facial, uterine



How the artery terminate?

- 1- Into the capillary bed.
- 2- Into sinusoids as in liver, bone marrow.
- 3- By direct communication with a venule in arterio- venous Anastomosis.
- 4- By direct connection with another arteriole in arterial anastomosis.
- 5- It **may end blindly without** any communication which if blocked or injured, results in local death of the tissue supplies.





Anastomoses

Def: It is a communication between two vessels by collateral channels

Types:

➤ **Arterial anastomosis:**

In arterial anastomosis the small artery connect with another small artery as **Palmar arterial arches**.

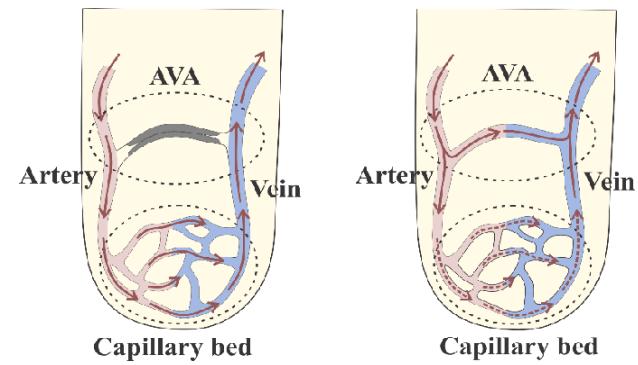
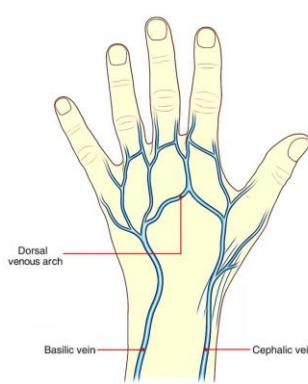
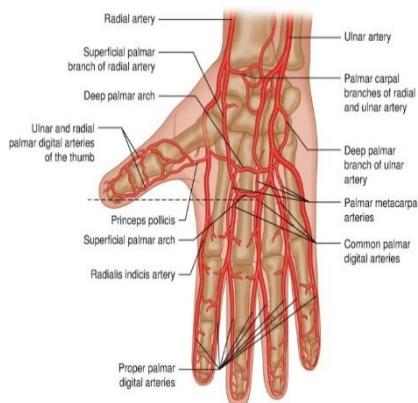
➤ **Venous anastomosis:**

-It is connection between tributaries of veins.

-It is observed at the majority of veins in the body as **Dorsal venous arches** in the hand

➤ **Arteriovenous anastomosis(AVA):**

This is connection between the small arteries and veins under sympathetic control as exposed parts of the skin and mucous membrane





Anatomy L7 : Nervous system

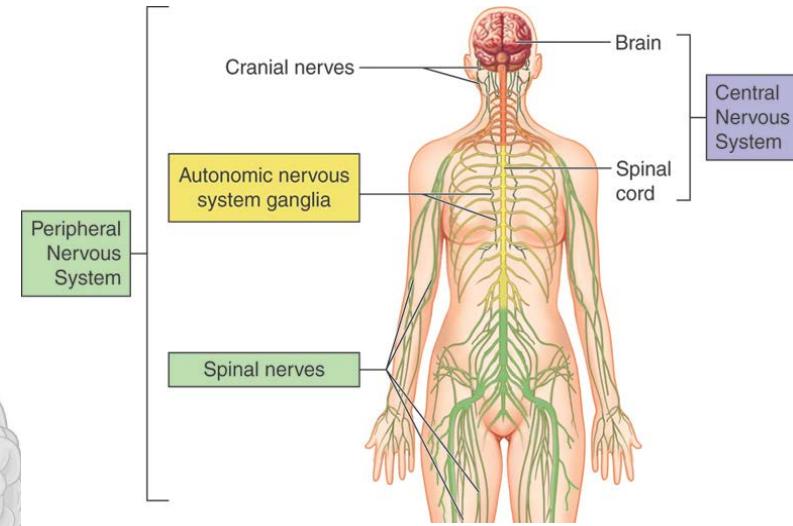
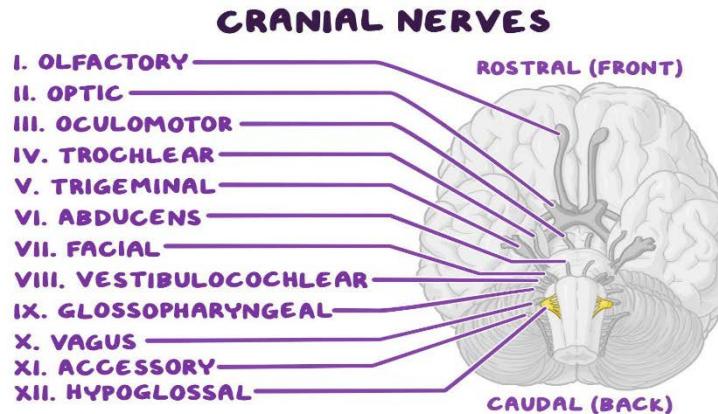
The nervous system has two main parts:

1- The central nervous system	2- The peripheral nervous system
brain (inside the skull) and spinal cord (inside the vertebral column)	branch from brain * 12 pairs of cranial nerves, spinal cord * 31 pairs of spinal nerves and their ganglia

Cranial nerves

* 12 pairs of cranial nerves that exists the skull through foramina.

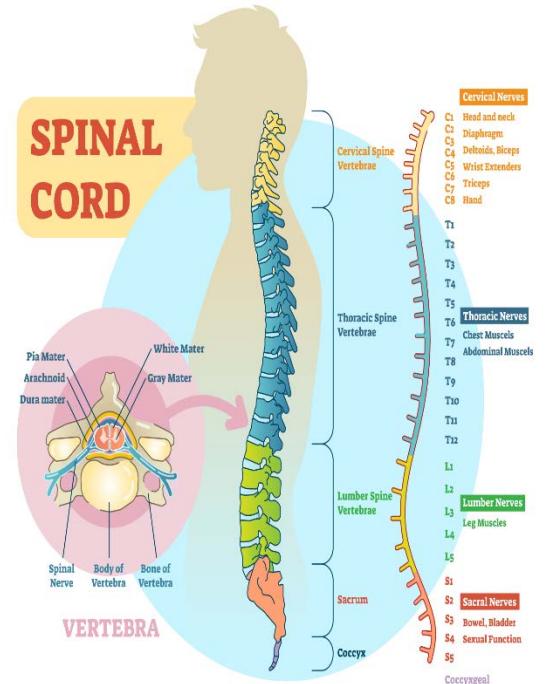
- Sensory nerves : 1,2&8
- Mixed nerves : 3,5,7,9,10
- Motor nerves : 4,6,11,12



Spinal nerves

Nerves attached to spinal cord & 31 pairs in number.

- All spinal nerves are functionally mixed.
- They are divided into 8 cervical , 12 thoracic , 5 lumbar , 5 sacral and one coccygeal.





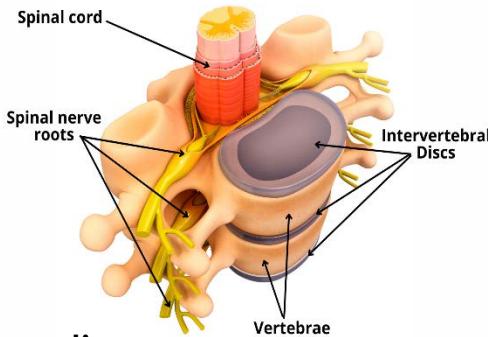
Spinal nerve exits from intervertebral foramen.

❖ Ganglion:

collection of nerve cells outside the central nervous system.

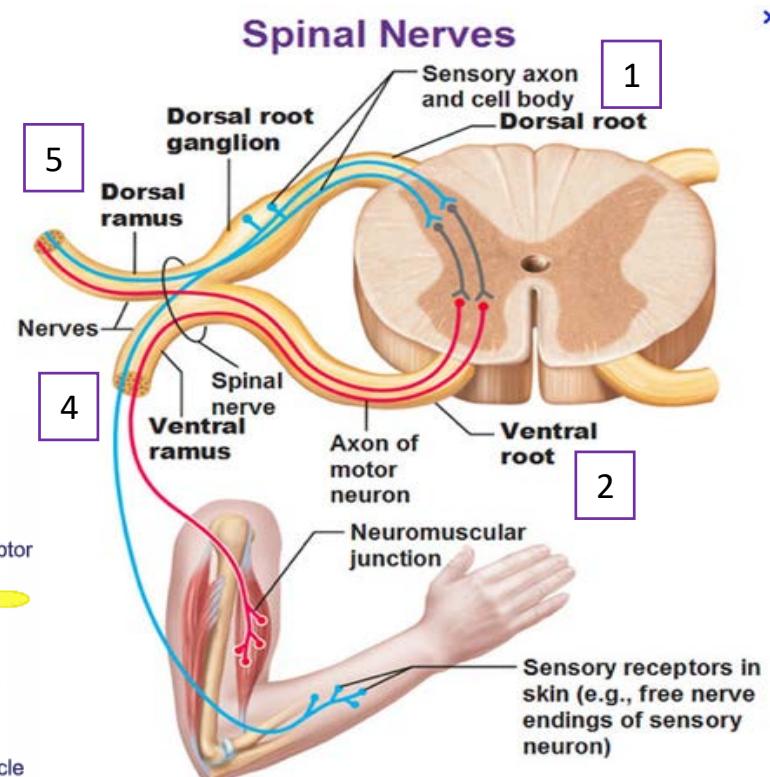
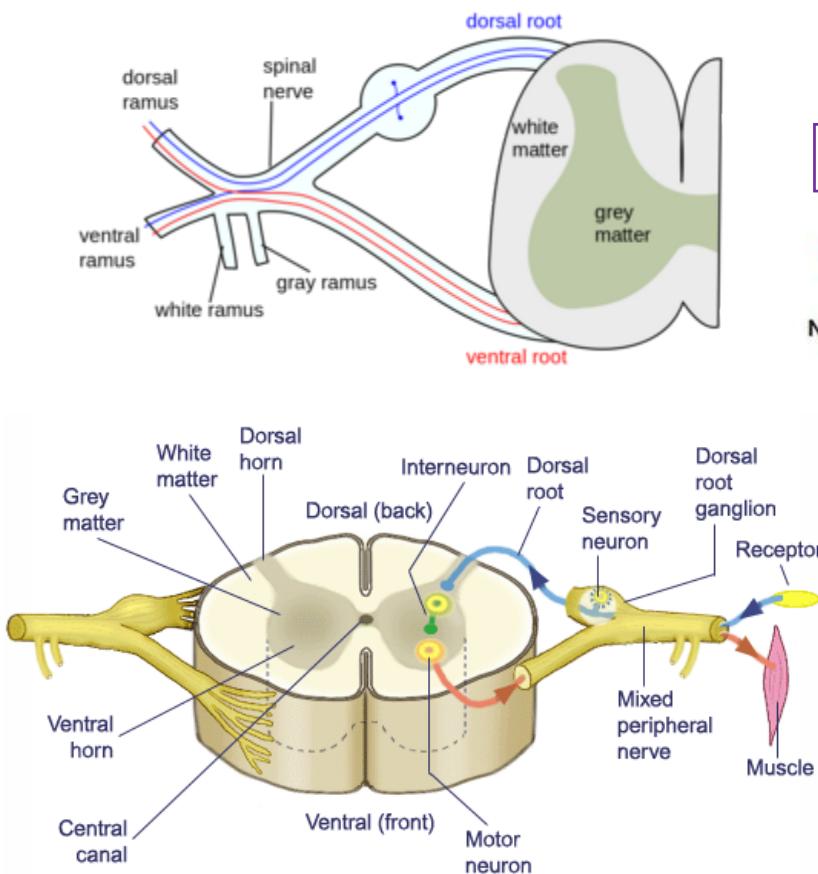
Types of ganglia :

- Sensory ganglia : as dorsal root ganglia.
- Autonomic ganglia : as sympathetic and parasympathetic ganglia.



❖ Parts of spinal nerves :

- 1- **Posterior root:** afferent (carry sensation).
It is its cell bodies lie in dorsal root ganglion.
- 2- **Anterior root:** efferent (motor).
- 3- **Mixed nerve trunk:** made of union of anterior and posterior roots.
- 4- **Anterior ramus:** supply muscle and skin of lateral and front of the body, form plexus.
- 5- **Posterior ramus:** supply muscle and skin of back, not form plexus.





❖ Structure of the Nervous System :

Consists of neurons and neuroglia(supporting).

Neuron

- It is the structural and functional unit of the nervous system.

Structure of the neuron:

it formed of cell body (soma) and processes (dendrites- axon):

1- Cell body.

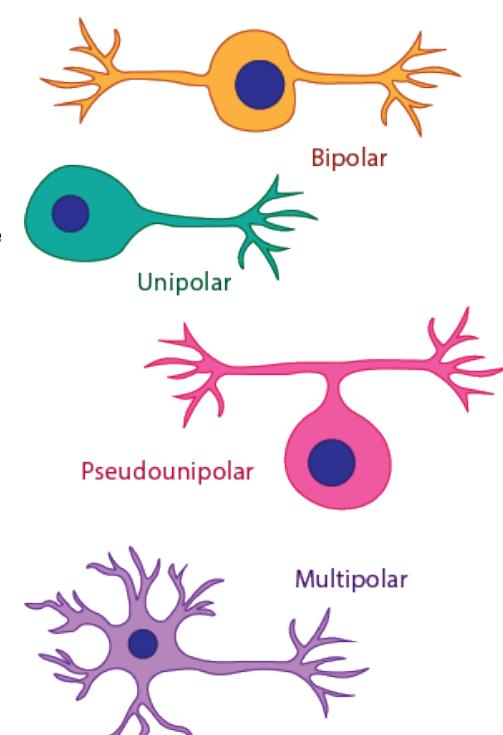
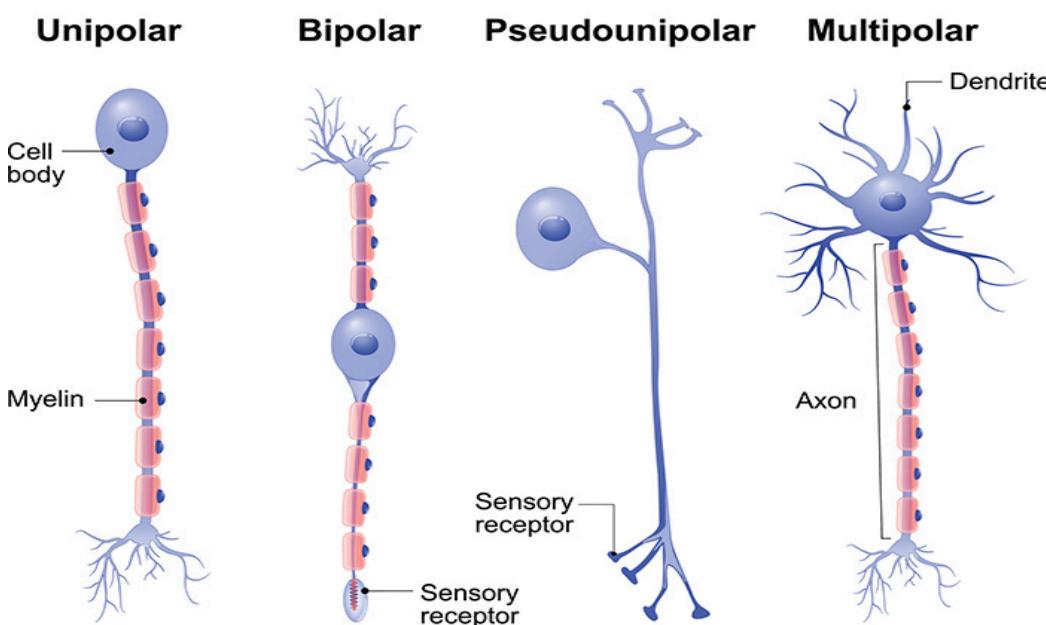
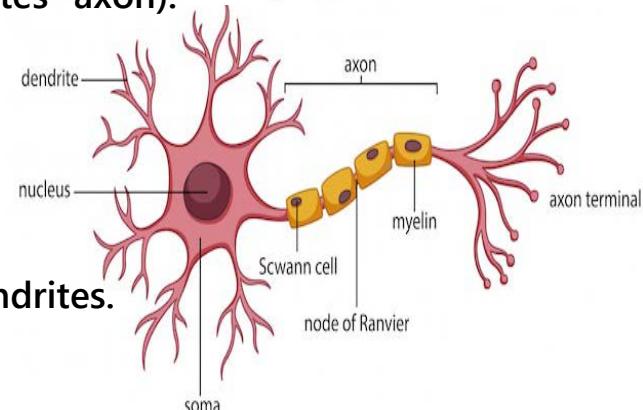
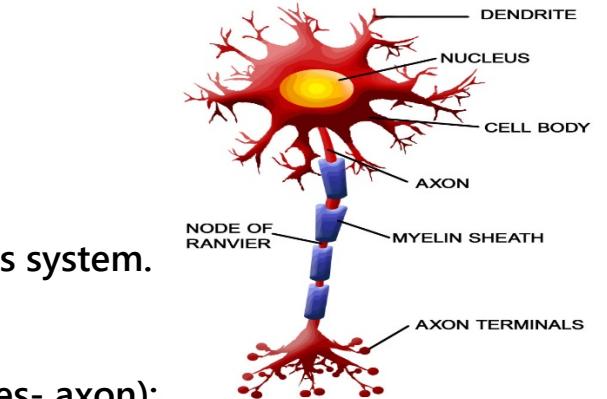
Cytoplasm contains: nucleus & other organelles.

Not contain: centrioles so can't divide.

2- Processes: Long single axon & short multiple dendrites.

Types of neurons :

- According to number of processes :
- Proper unipolar: has only one pole.
- Pseudo- unipolar T-shaped has = one process that divides into central branch (function axon) as peripheral branch (as dendrite).
- Bipolar: Has two processes one axon and one dendrite.
- Multipolar neuron: has one axon and several dendrites.

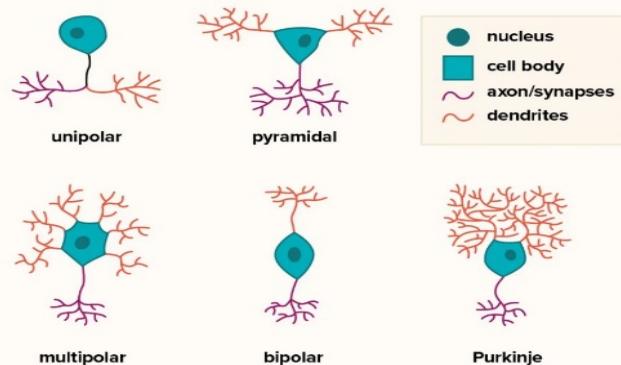




- According to shape :

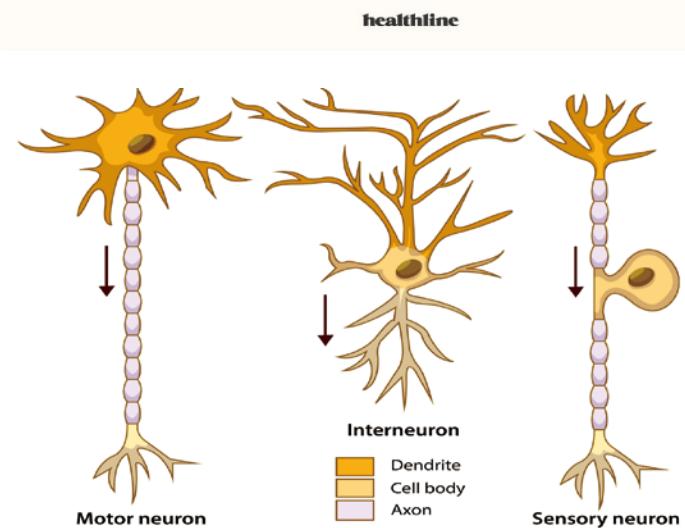
- Pyramidal cells
- Fusiform cells
- Polygonal cells

Types of neurons



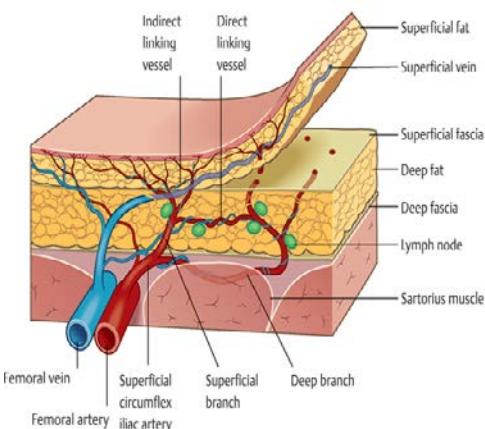
- According to function :

- sensory
- motor
- interneuron





Anatomy L8 : Fascia



Collection of connective tissue

Superficial Fascia

Deep Fascia

Definition
Distribution
Special features

Superficial Fascia

Definition : General coating of the body beneath the skin made up of loose areolar tissue and fat.

In females , there is **more** fat and it is evenly distributed.

Absent from :

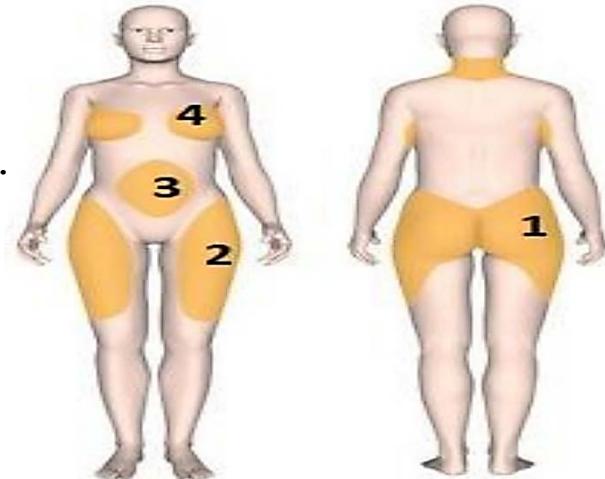
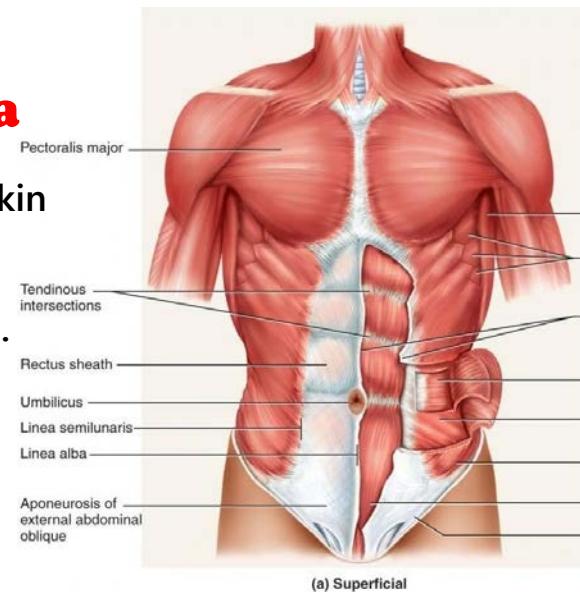
- Eyelids , External ear
- Nipple & Areola of the breast
- Penis and Scrotum

Abundant in :

- 1- Buttocks (gluteal region) & Flanks (lumbar region).
- 2- Front and medial side of Thighs.
- 3- Anterior abdominal wall below umbilicus.
- 4- Breast and Axilla

Important features :

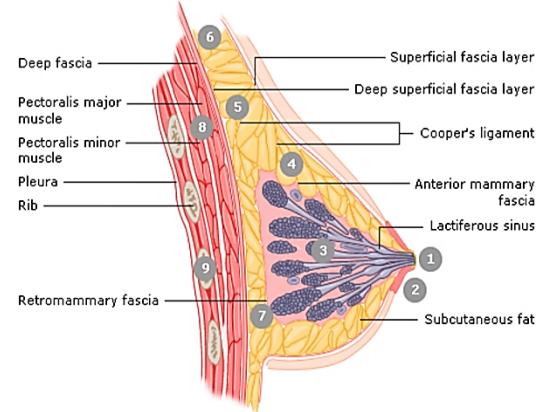
- Most **distinct** in lower part of anterior abdominal wall & limbs.
- Very **thin** on dorsal aspect of hands & feet, sides of neck, face.
- Very **dense** in scalp, palms and soles.





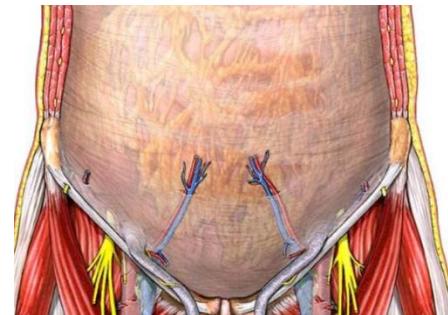
Contents of the superficial fascia :

- 1- Muscles as Ms of facial expression in face.
- 2- Mammary glands.
- 3- Cutaneous nerves and vessels and lymph nodes.



Functions :

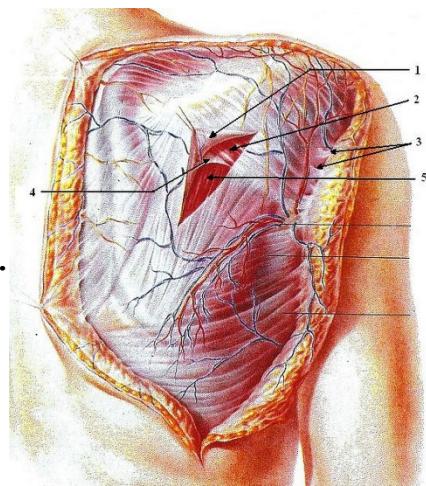
- Helps in movement of skin.
- Allow for the passage of the vessels & nerves to the skin.
- Conserves body heat as fat is a bad conductor of heat.



Deep fascia (Investing fascia)

Definition : is the strong fibrous sheet, which invests the body beneath the superficial fascia.

Formed of collagen fibers so it is tough, not elastic.



Distribution of deep fascia

- Best seen in limbs where it forms tough and tight sleeves.
- Well defined in the neck where it forms a collar.
- Not well formed on the trunk and face.

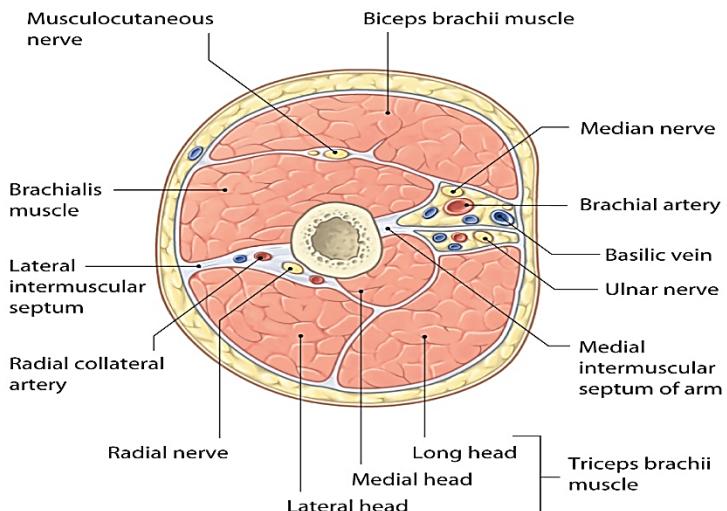




Modifications of deep fascia

A) Extensions (prolongations) to form :

- 1- Septa, between limb muscles.
- 2-Sheath around muscle.
- 3- Sheath for the nerves & vessels.



B) Thickenings to form :

1- Retinacula :

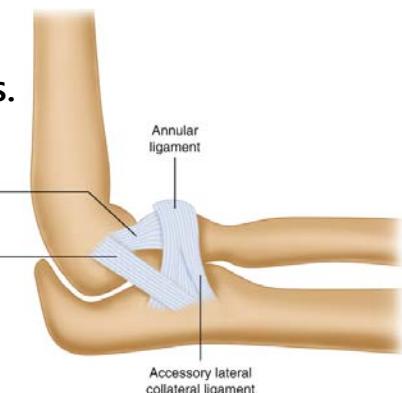
Keep the tendons in place during contraction. mainly the wrist and ankle.

2- Aponeurosis :

protect the underlying structures as in palmar and plantar aponeurosis.

3- Ligaments :

These are strong, fibrous bands which connect bones at joints.



C) Interruption of deep fascia

Absent of deep fascia at surfaces of bones

D) Internal fascia

- It lines the body cavities and fills the spaces.
- It covers organs and forms passages for vessels & nerves.

