



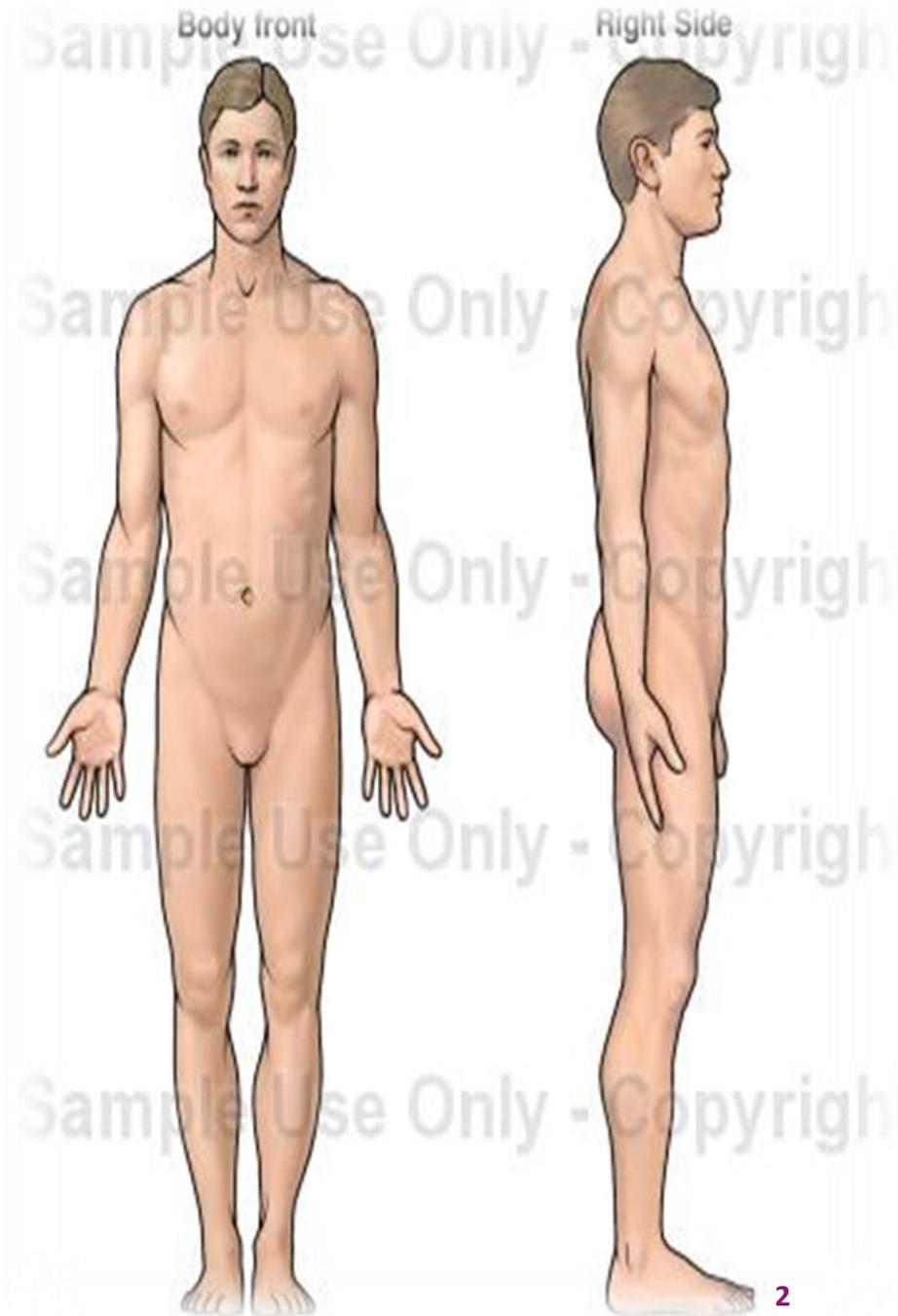
INTRODUCTION TO HUMAN ANATOMY

BY DR. DALLA MAHMOUD BIRAM

Anatomical Position

The anatomical position refers to the body position as if the person were **standing upright** with the:

- ❖ **The head**, gaze (**eyes**) (forward)
- ❖ **The arms** adjacent to the sides
- ❖ **The palms** facing anteriorly,
- ❖ **The lower limbs** close together
- ❖ **The feet** parallel.
- ❖ **The toes** directed anteriorly (forward)



Terms of position •

Superior= cranial •

inferior= caudal

medial: near to the midline

lateral: away from midline

anterior= ventral

(near to the front of the body)

posterior= dorsal

(near to the back of the body)

Superficial :near to the skin

deep: far away

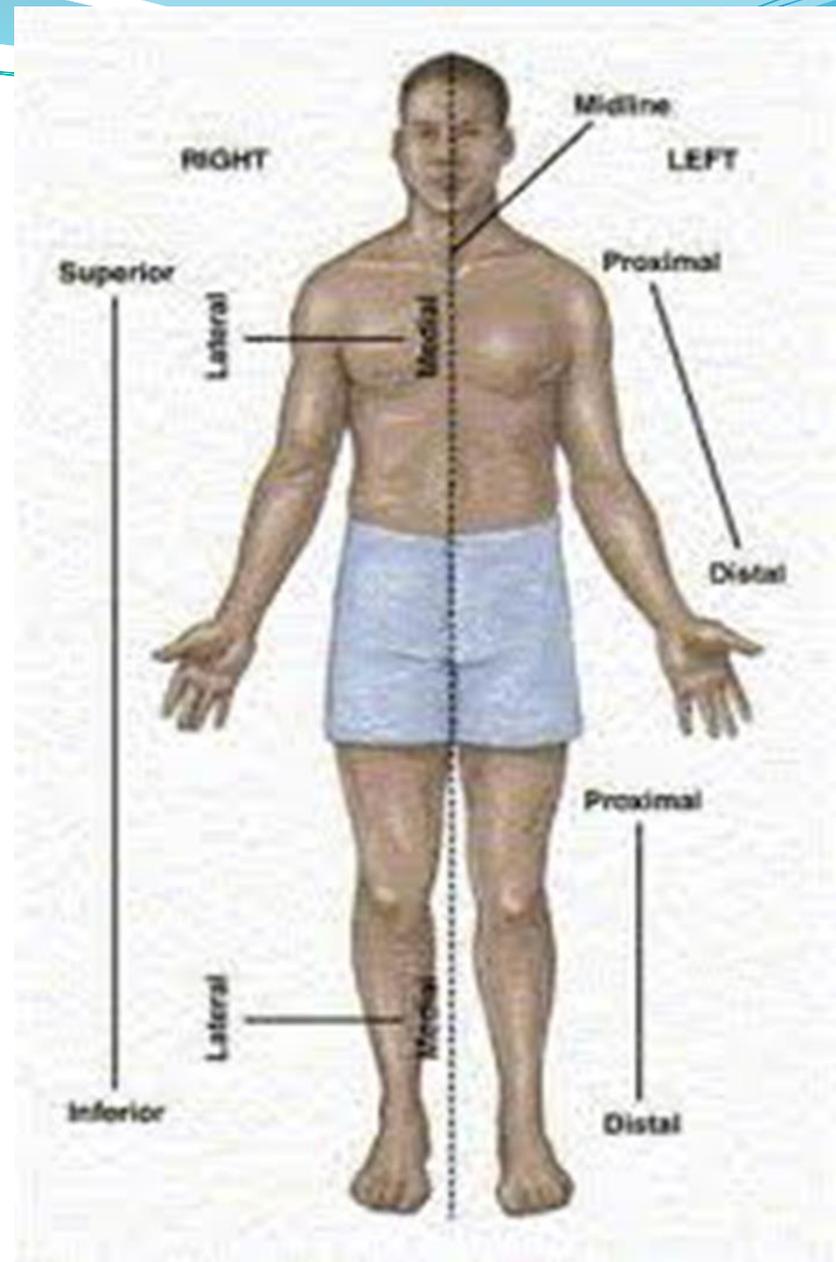
from the skin

proximal: near to the root of the limb

distal: far away from the root of the limb

❑ In describing **the hand**, the terms **palmar** and **dorsal** surfaces are used in place of **anterior** and **posterior**,

❑ in describing **the foot**, the terms **plantar** and **dorsal** surfaces are used instead of **lower** and **upper** surfaces



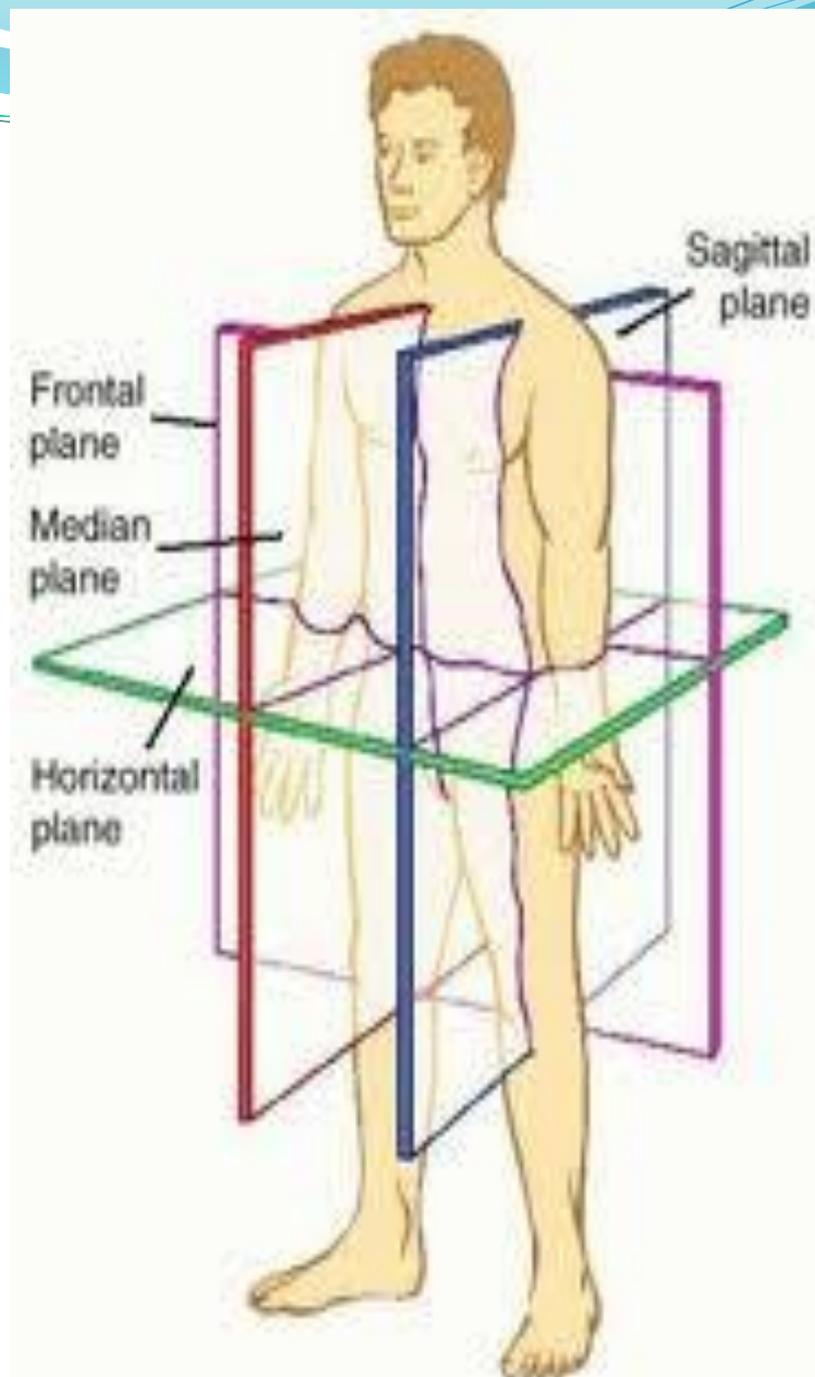
Anatomical planes

Median sagittal plane: vertical Plane pass through the middle of the body divide it into 2 equal halves

Paramedian plane (sagittal Plane)

Coronal plane: divide the body Into anterior and posterior

Horizontal plane: divide the body into upper and lower parts



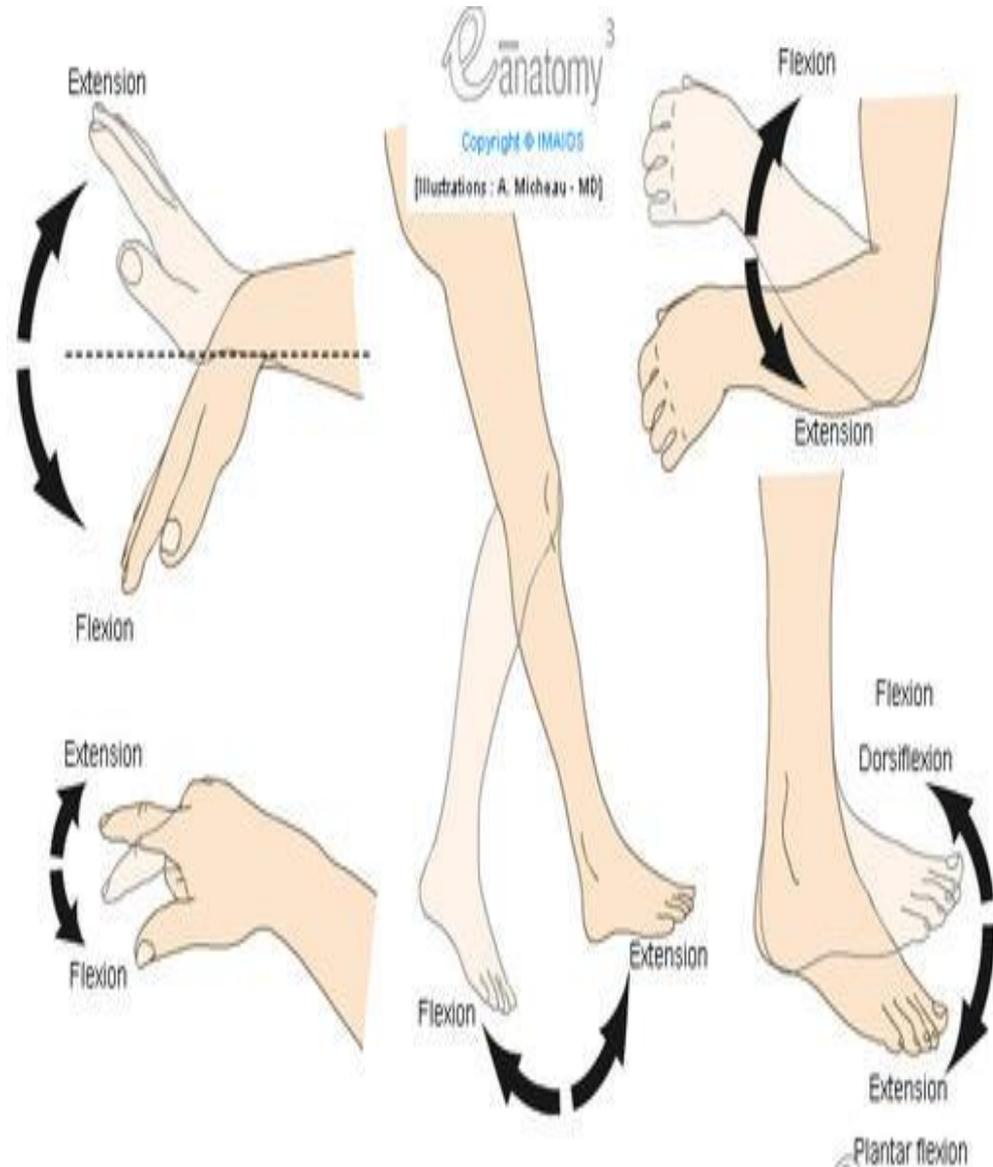
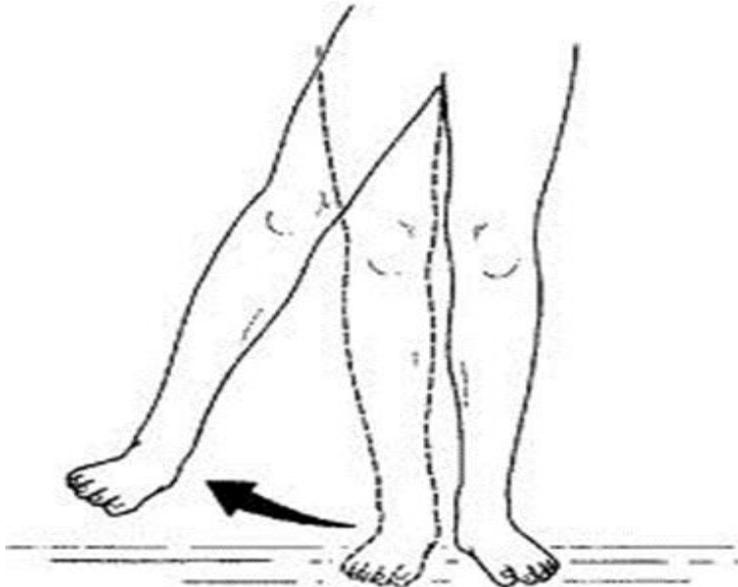
TERMS OF MOVEMENT

Flexion: means bending.

Extension: means straightening.

Abduction: means movement away from the median plane

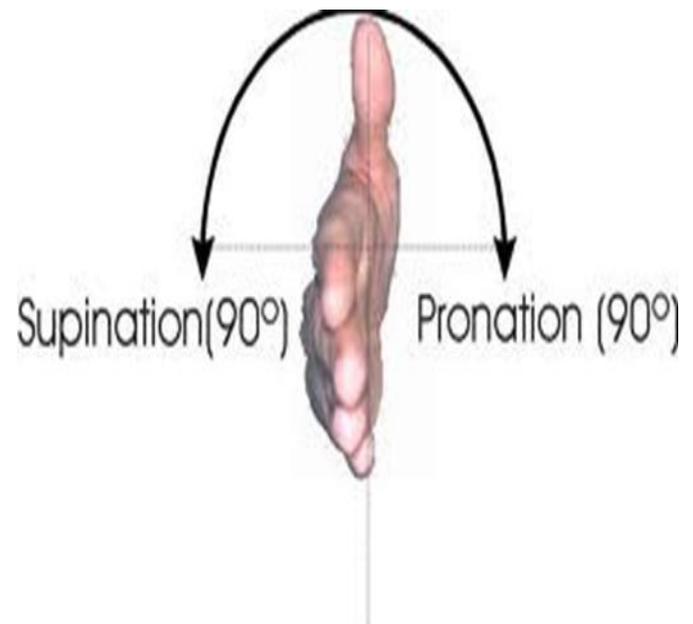
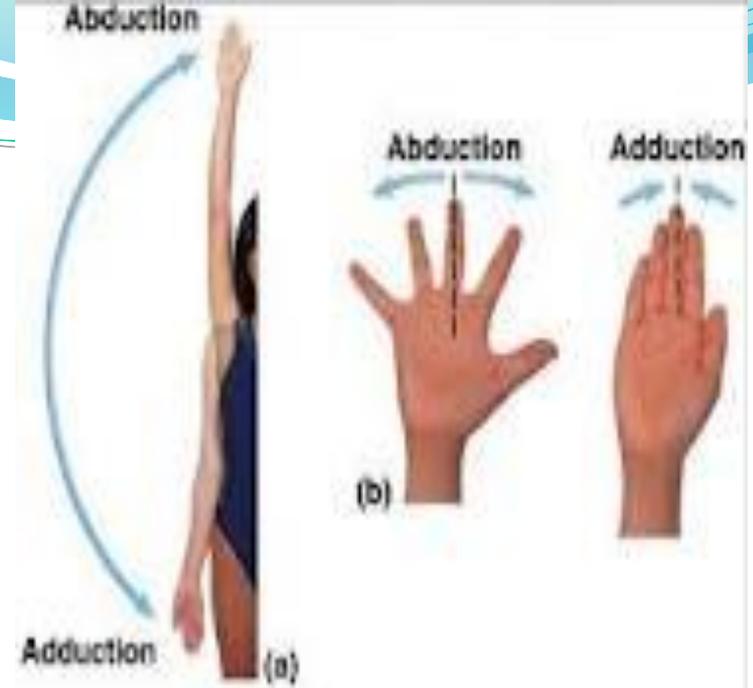
-Adduction: means movement towards the median plane.



Circumduction: It is a circular movement which includes the previous movements (flexion, abduction, extension and adduction). Circumduction occurs in few joints as the **shoulder** and the **hip joint**.

Supination: It is the normal resting position of the forearm, where the palm of the hand faces forwards and the thumb is lateral.

-Pronation: It is opposite to supination, that is the palm of the hand faces backwards and the thumb is medial.

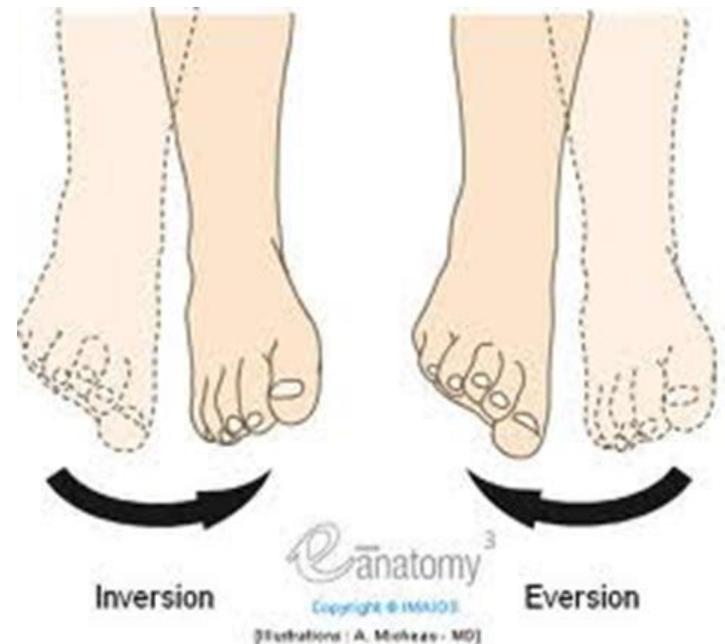
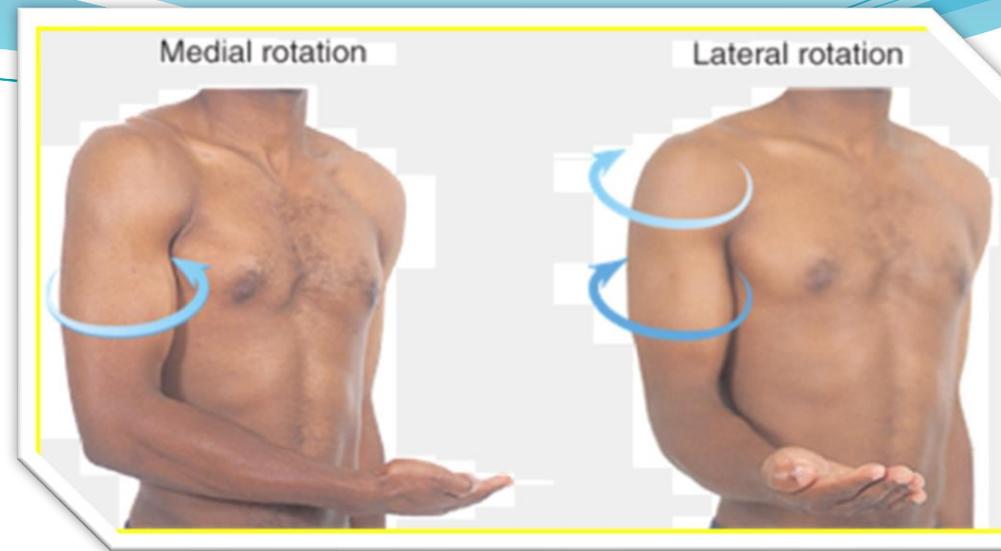


❖ **Rotation** is the term applied to the movement of a part of the body around its long axis.

Medial rotation: where the anterior surface of the bone faces medially.

- **Lateral rotation:** where the anterior surface of the bone faces laterally.

- **Inversion:** This movement occurs only in **the feet** where the planter surface of the foot faces medially.
- **-Eversion:** It is opposite to inversion, where the planter surface of the foot faces laterally.



LAYERS OF THE BODY

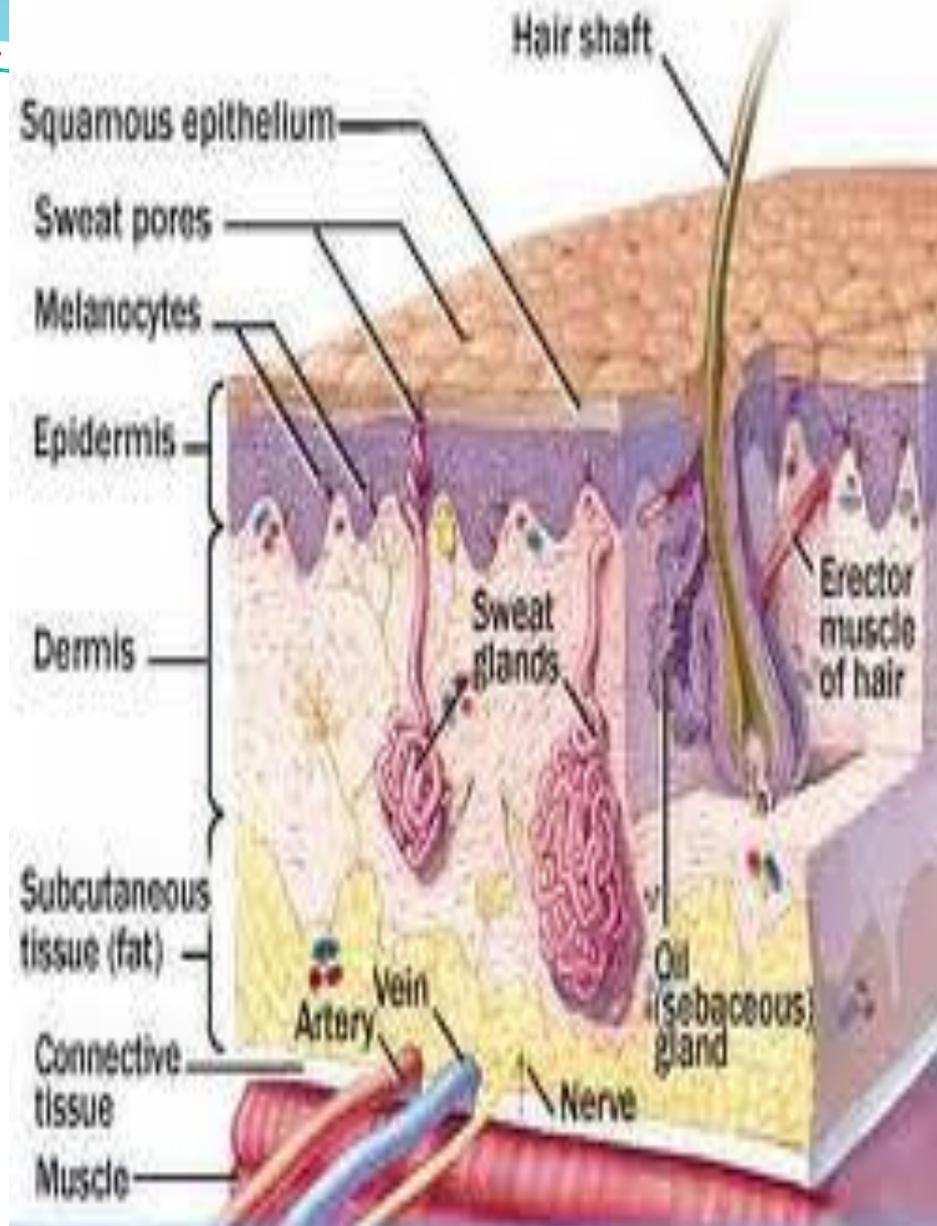
skin

The skin is divided into two parts:
The superficial part, **the epidermis**;
The deep part, **the dermis**

The epidermis is a **stratified epithelium**
On the palms of the hands and the soles
of the feet, the epidermis is **extremely
thick**

The dermis is composed of **dense
connective tissue** containing many **blood
vessels**, **lymphatic vessels**, and **nerves**.

The dermis of the skin is connected to
the underlying **deep fascia** or **bones** by
the **superficial fascia** known as
subcutaneous tissue.



skin

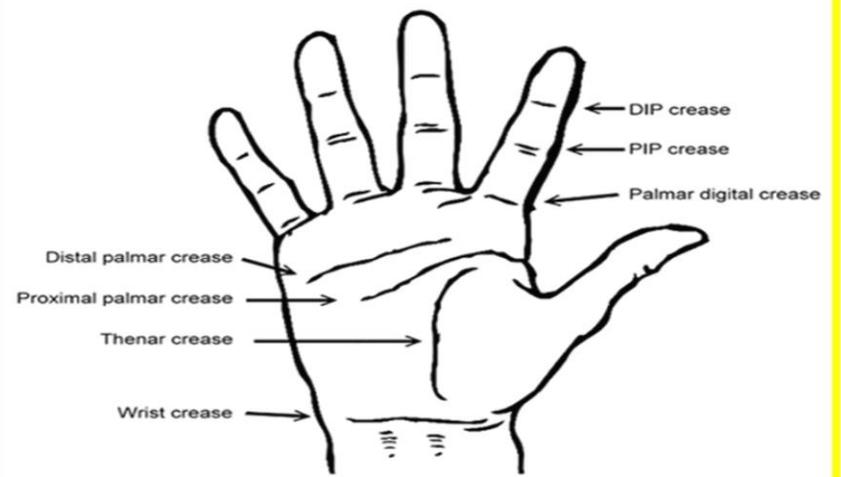
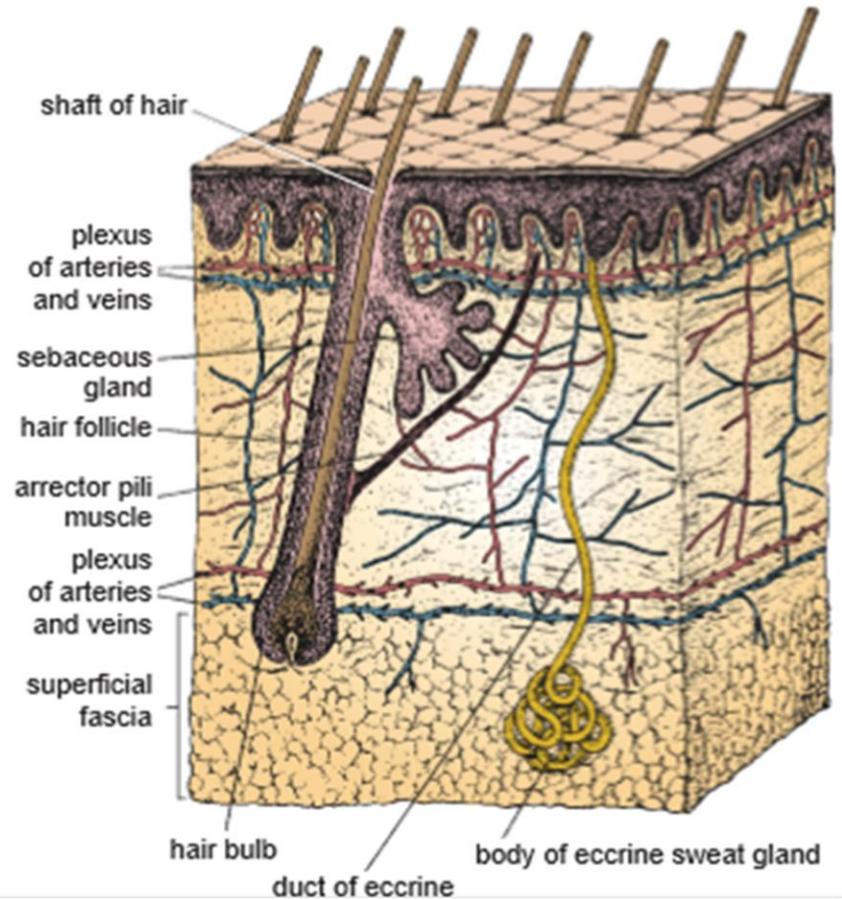
It is **thick** in some places (palm of the hand) and **thin** in other places (eye-lids).

It is **hairy** in some places (scalp) and **non-hairy** in other places (lips, palm of hand and sole of feet).

The skin has 4 appendages .

These are: **nails, hair, sebaceous glands and sweat glands**. It also contains muscle (arrector pili), vessels, nerves, and lymphatics.

❖ The skin over joints always folds in the same place, **the SKIN CREASES**



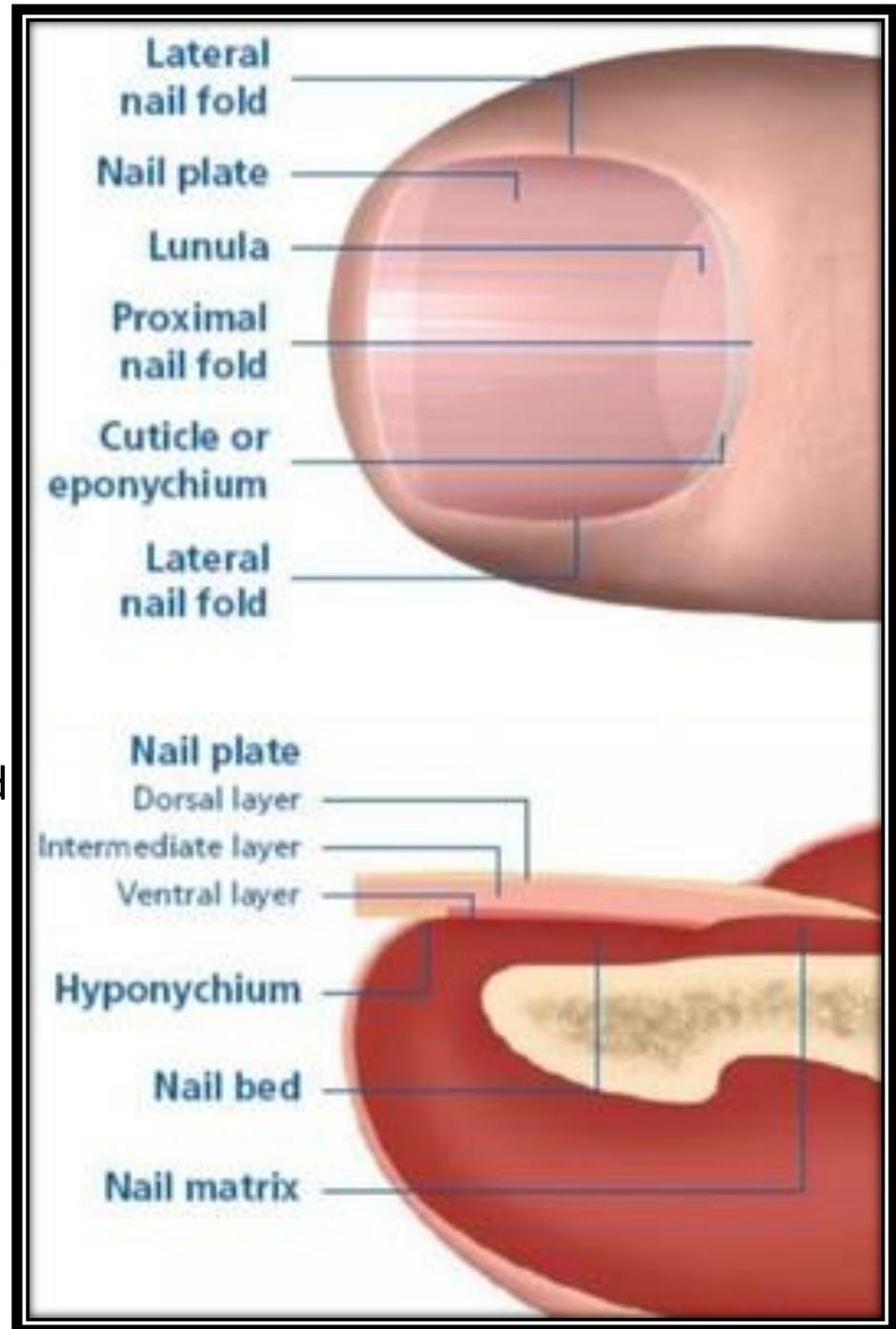
Skin

❖ **The nails** are **keratinized plates** on the dorsal surfaces of the tips of the fingers and toes.

❖ The proximal edge of the plate is the **root of the nail**.

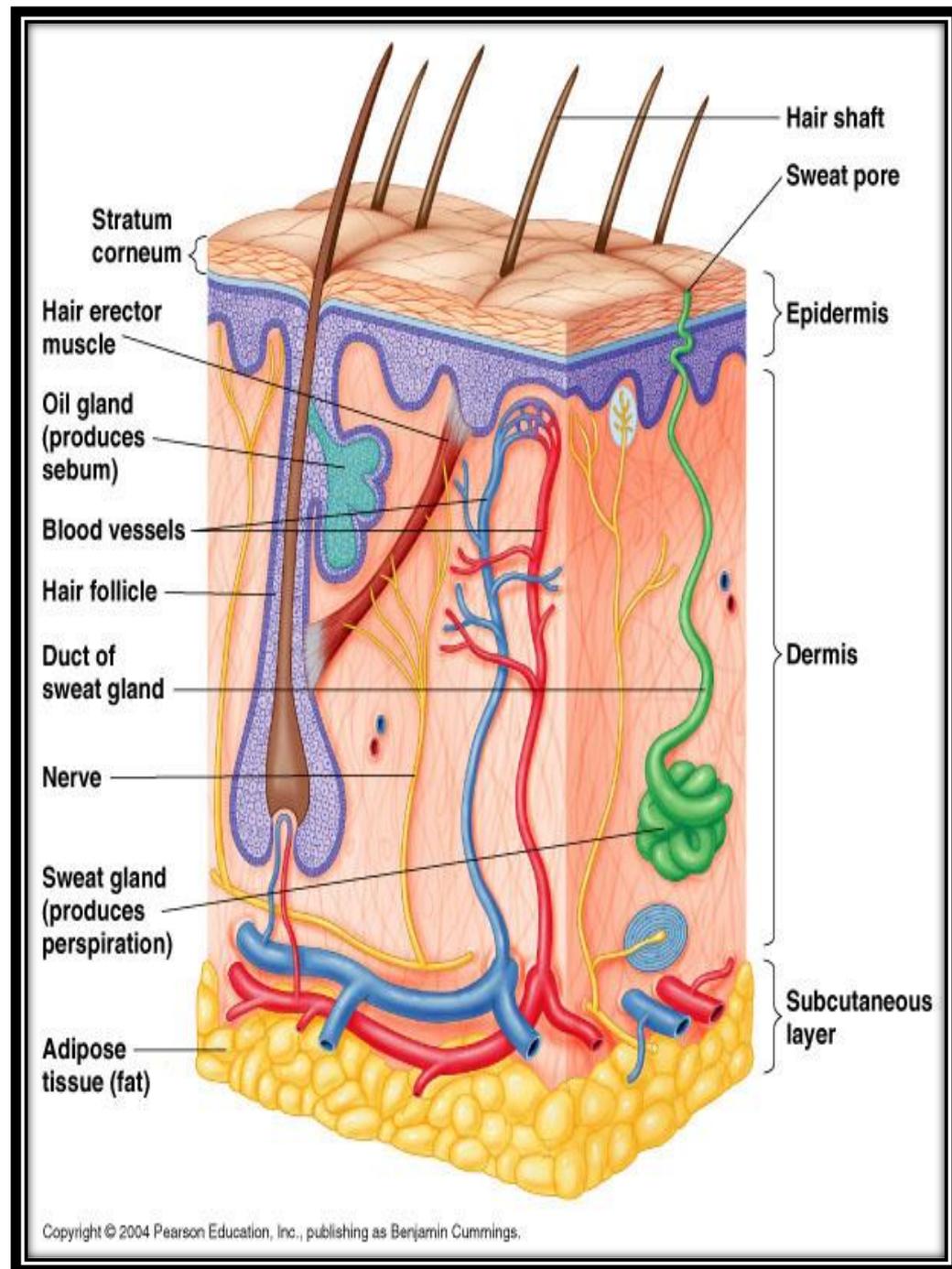
❖ **the nail** is surrounded and overlapped by folds of skin Known as **nail folds**.

❖ The surface of skin covered by the nail is **the nail bed**



Skin

- ✓ Hairs grow out of **follicles**, which are **invaginations of the epidermis into the dermis** and their expanded extremities, called **hair bulbs**,
- ✓ Each **hair bulb** is concave at its end, and the concavity is occupied by vascular connective tissue called **hair papilla**.
- ✓ A band of smooth muscle, **the arrector pili**, connects the undersurface of the follicle to the superficial part of the dermis
- ✓ **Sebaceous glands** pour their secretion, **the sebum**, onto the shafts of the hairs as they pass up through **the necks of the follicles**.
- ✓ **Sweat glands** are **long, spiral, tubular glands** distributed over the surface of the body, except on the **red margins of the lips**, the **nail beds**, and the **glans penis** and **clitoris**.



APPLIED ANATOMY

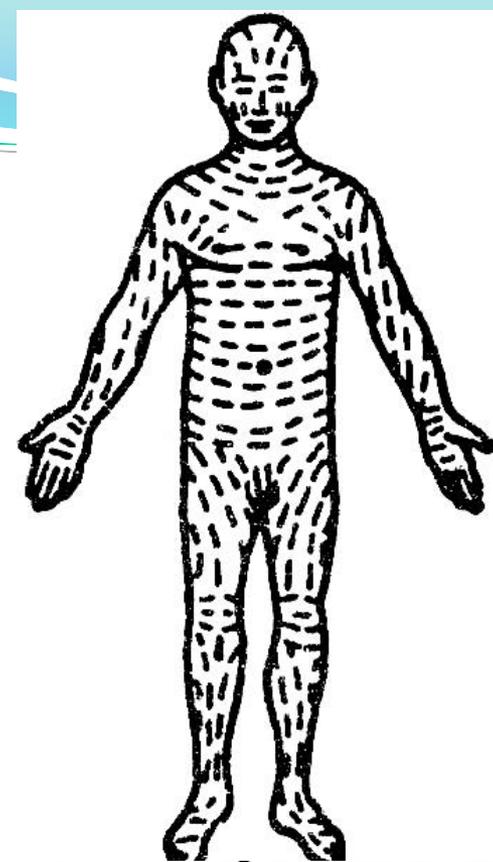
Langer's Lines are groups of **collagen fibers** running deep in the dermis parallel to each other

It is important for surgeons, when they make an incision not to injure too much collagen fibers. Incisions made across "**Langer's Lines**" result in gapping of the wound and prominent scar tissue.

- **Skin Incisions:**

The incisions are mostly parallel to Langer's Lines in order to leave narrow scars.

- **Burns:** During burns the skin is removed from the area burnt. Burns are classified into degrees according to the depth of the burn and its size.
- **Albinism:** Is the absence of the melanin pigment from the skin. The skin looks white in color with a pinkish ting of the underlying vessels.



FASCIA

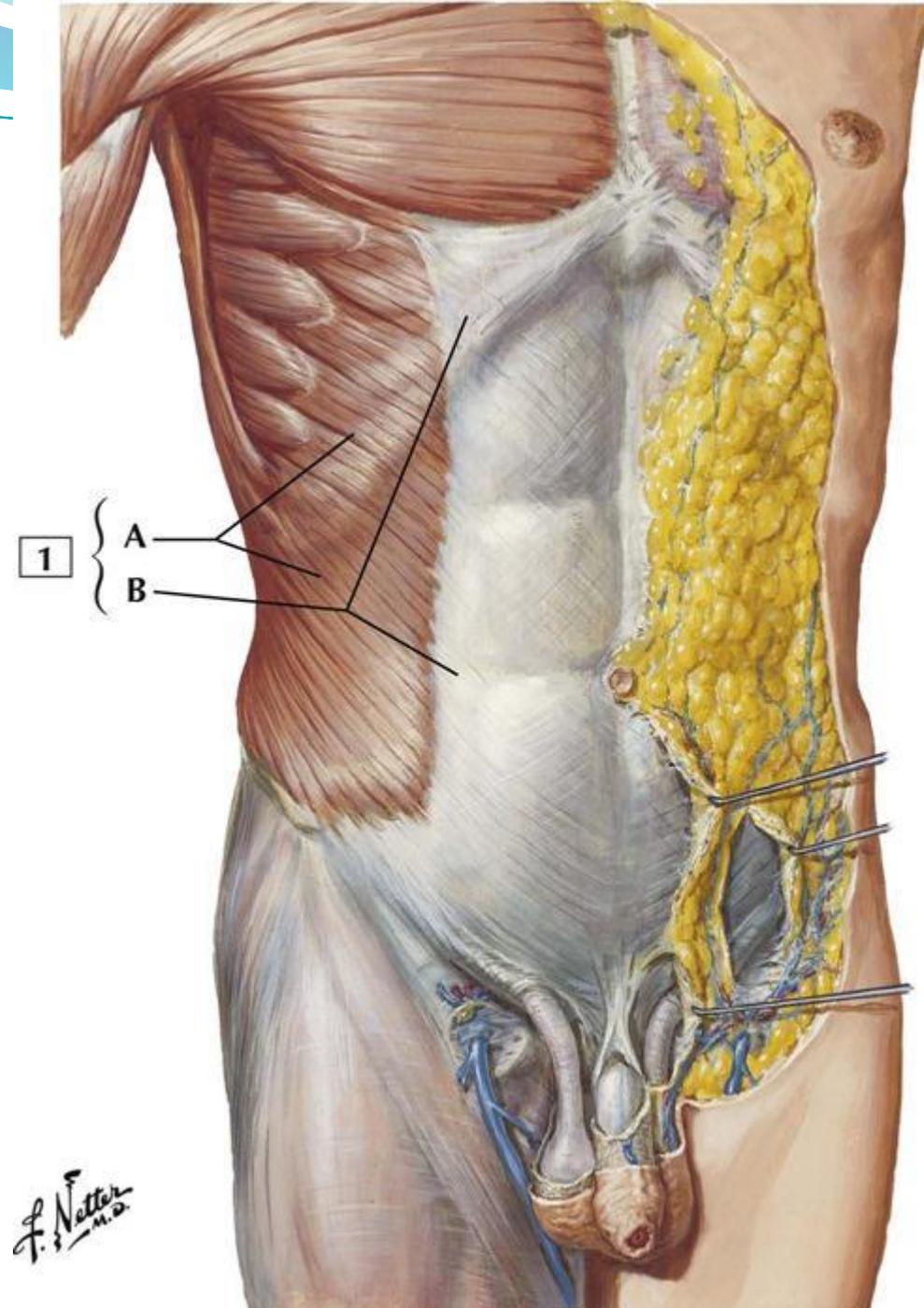
Fascia is defined as a collection of connective tissue that can be divided into two types— **superficial** and **deep**—and lie between the skin and the underlying muscles and bones

❖ **The superficial fascia**, or subcutaneous tissue, is a mixture of loose areolar and adipose tissue that unites the dermis of the skin to the underlying deep fascia

❖ **The deep fascia** is a membranous layer of connective tissue that invests the muscles and other deep structures

✓ In **the thorax** and **abdomen**, it is merely a thin film of areolar tissue covering the muscles and aponeuroses.

✓ In **the limbs**, it forms a definite sheath around the muscles and other structures, holding them in place.



Functions of SUPERFICIAL FASCIA:

I. The Superficial Fascia Contains Fat That:

1. Acts as a food reservoir.
2. Insulates the body heat from the environment.
3. Gives the rounded contour of female body.

II. The Superficial Fascia Contains Vessels and Nerves:

1. The vessels help in regulating body temperature.
2. The nerves carry the sensations from the skin.

In some places **it contains muscles** as:

face the fascial muscles.

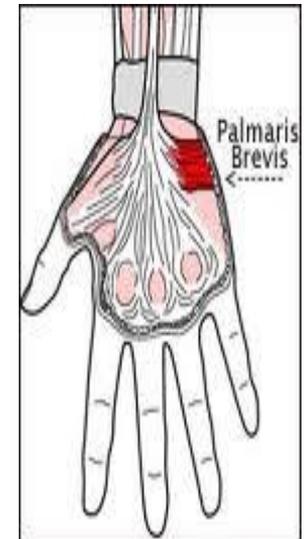
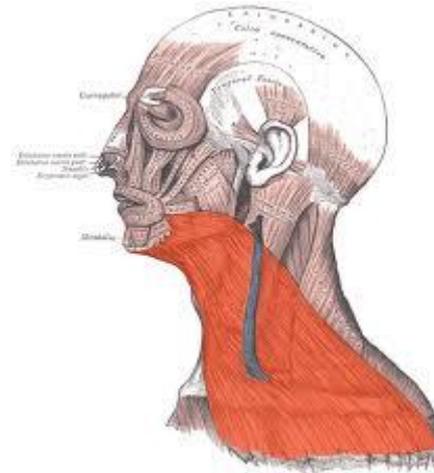
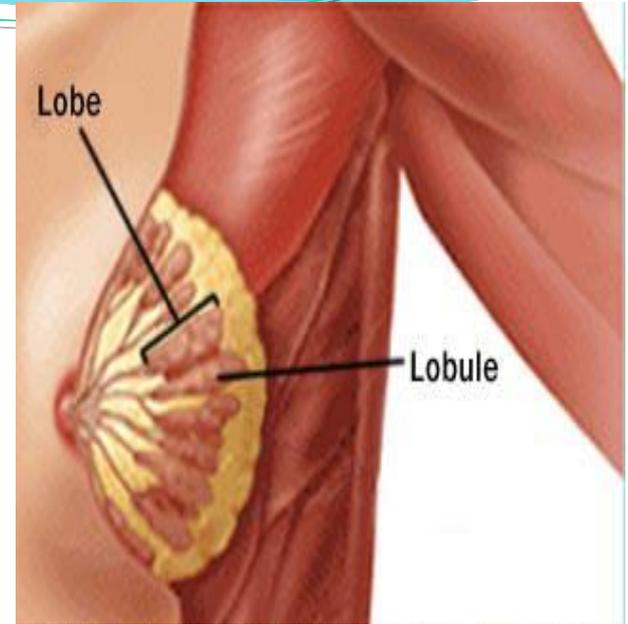
neck platysma muscle.

palm palmaris brevis muscle.

scrotum the dartos muscle

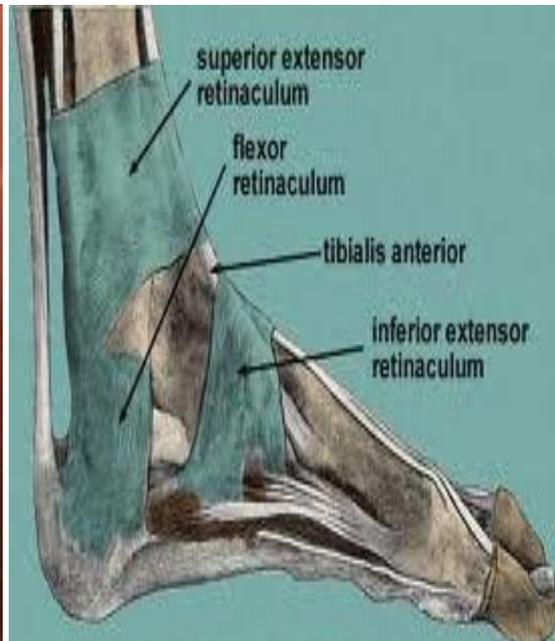
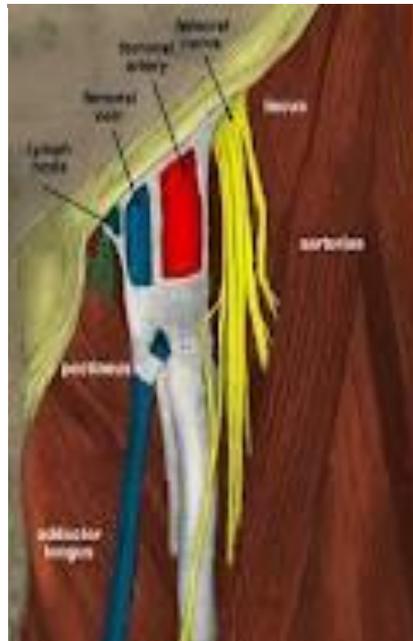
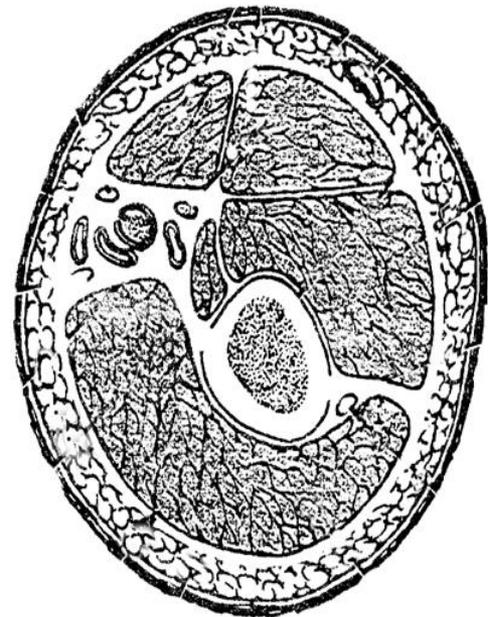
In some places **it contains glands** as:

The **mammary gland** in the pectoral region



TYPES OF DEEP FASCIA

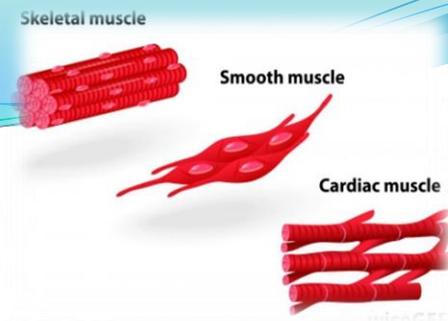
- 1-It sends fibrous tissue septa separating the muscles which are attached to the bone. These are called "**intermuscular septa**".
- 2-In some places the deep fascia is thickened to form "**retinacula**" around the wrist and ankle to keep the long tendons in place close to bones.
- 3-Around the big vessels the deep fascia thickens in a form of a sheath surrounding vessels and nerves to protect them as the "**Femoral Sheath**" and the "**Carotid Sheath**".



Muscle

Muscle tissue is characterized by the property of **contraction** which is the ability of the muscle fibers to **become short**.

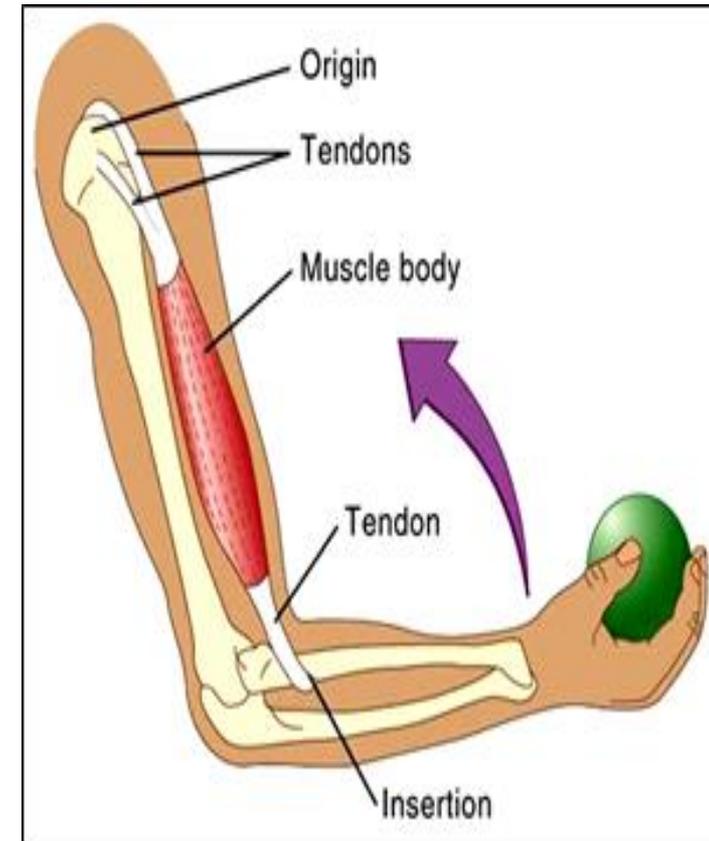
The three types of muscle are **skeletal**, **smooth**, and **cardiac**



Skeletal muscles

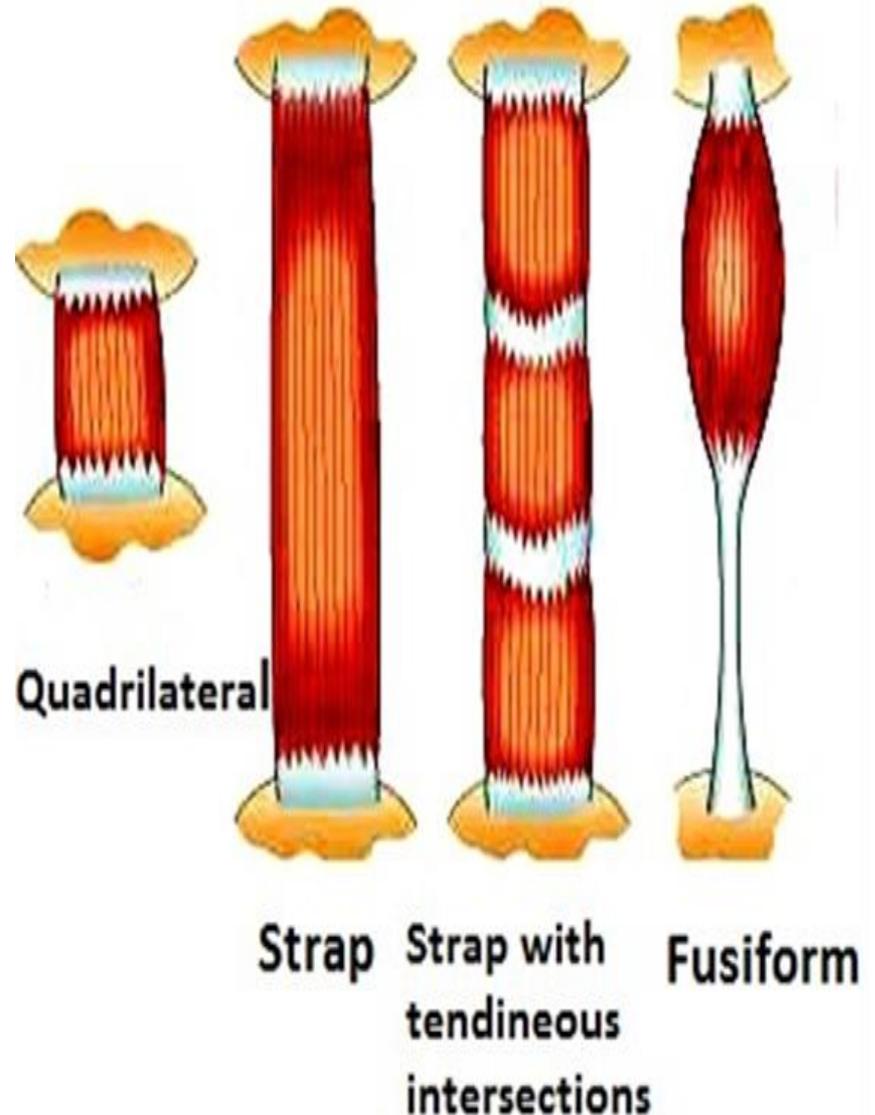
produce the movements of the skeleton; they are sometimes called **voluntary muscles** and are made up of **striated muscle fibres**. A skeletal muscle has two or more attachments.

- ✓ The **fleshy part** of the muscle is referred to as its **belly**
- ✓ The **ends of a muscle** are attached to bones, cartilage, or ligaments by **CORDS of fibrous tissue called tendons**
- ✓ Occasionally, **flattened muscles** are attached by a thin but **strong sheet of fibrous tissue called an aponeurosis**
- ✓ The fixed and proximal attachment is called **origin**
- ✓ The mobile and distal attachment is called **insertion**
- ✓ A **raphe** is an **interdigitation of the muscle fibers of flat muscles**



Types of Skeletal Muscles According to Arrangement of Fibers

- Skeletal muscles vary in shape and arrangement of their fibers to produce a specific force and range of contraction.
 - The muscle form depends on the arrangement of the muscle fibers in relation to the line of pull of the muscle.
 - Line of Pull: The line of pull of a muscle is the line extending between its origin and insertion.
 - The fibers of the muscle are either arranged parallel to the line of pull or oblique to it.
- A) Muscles which have fibers lie parallel to the line of pull:**
1. Strap-like muscle: e.g. sartorius muscle.
 2. Strap-like muscle with tendinous intersections e.g. rectus abdominis muscle.
 3. Quadrilateral muscle e.g. thyrohyoid muscle.
 4. Fusiform muscle: e.g. biceps brachii muscle.



B) Muscles which their fibers lie oblique to the line of pull:

I. Pennate muscles : (feather-like)

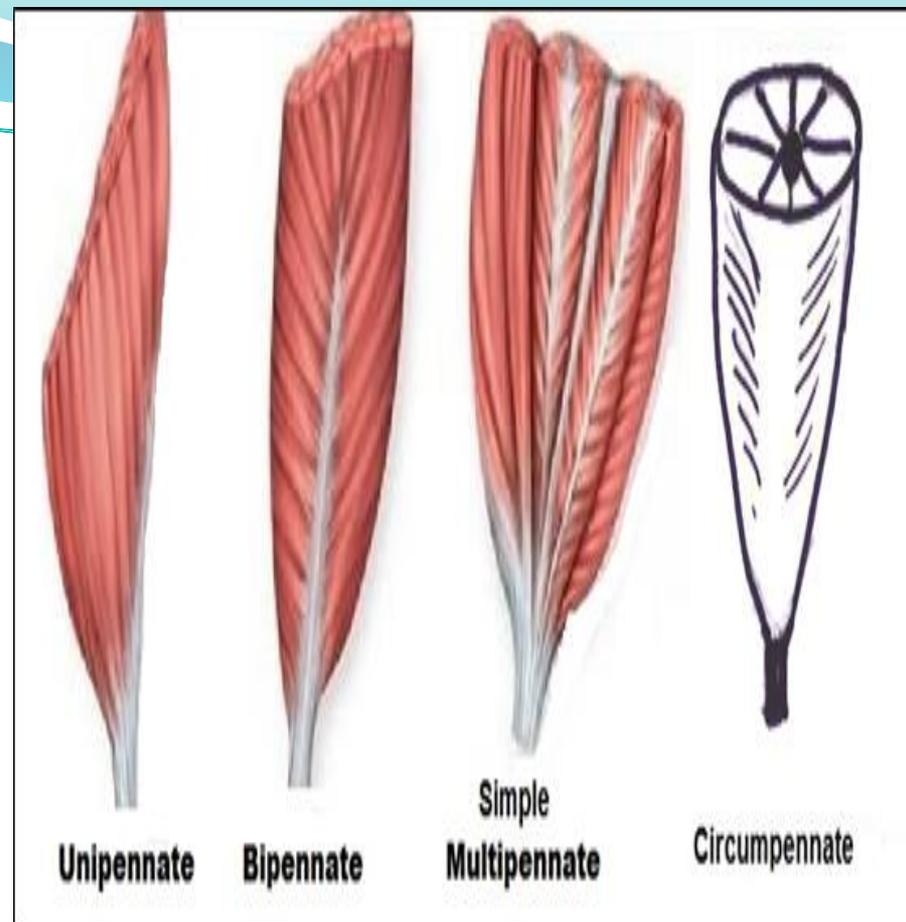
The muscle fibers lie oblique to the tendons, they are 4 types:

a-Unipennate muscles: The fibers lie on one side of the tendon, e.g. flexor pollicis longus muscle.

b-Bipennate muscles: The fibers lie on both sides of the tendon, e.g. rectus femoris muscle.

c-Multipennate muscles: Each is formed of many bipennate units lying beside each other e.g. Deltoid muscle.

d- Circumpennate muscles: Each muscle is cylindrical with a central tendon and bipennate units converging from the periphery towards the tendon e.g. tibialis anterior muscle.



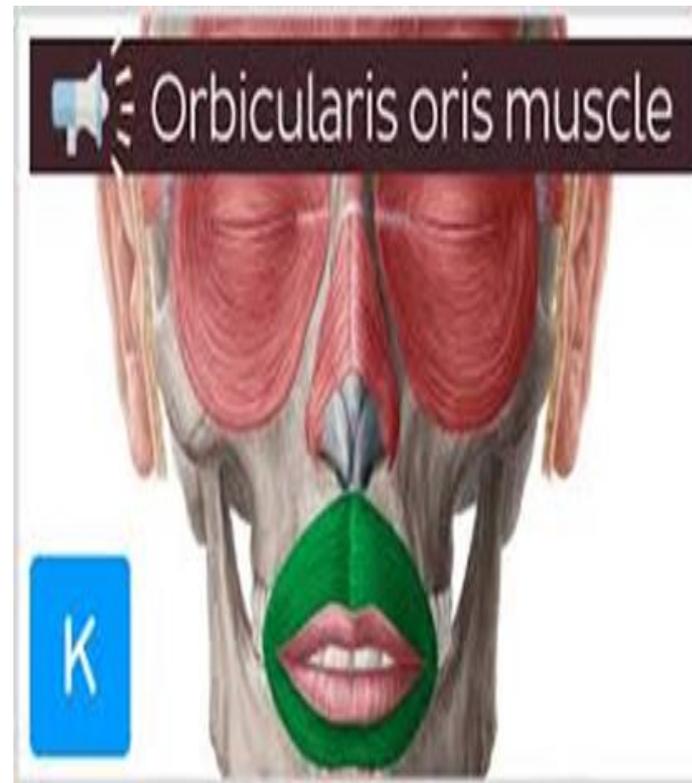
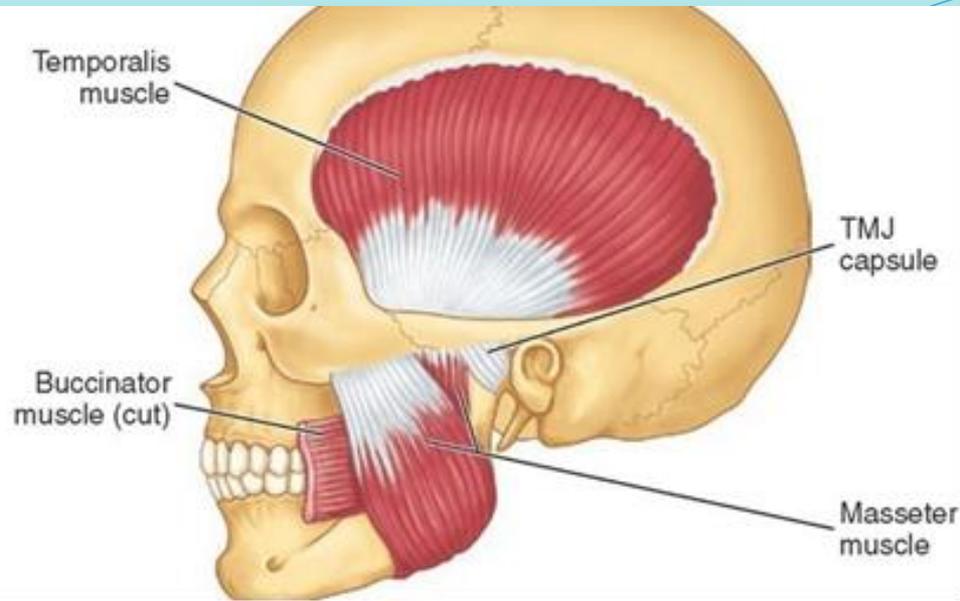
- **II. Non-pennate fibers:**

- a. **Triangular** muscles e.g. temporalis muscle.

- b. **Cruciate** muscles e.g. masseter muscle.

- c. **Spiral** muscles e.g. supinator muscle.

- d. **Circular** muscles e.g. orbicularis oris.



Work of the Muscles:

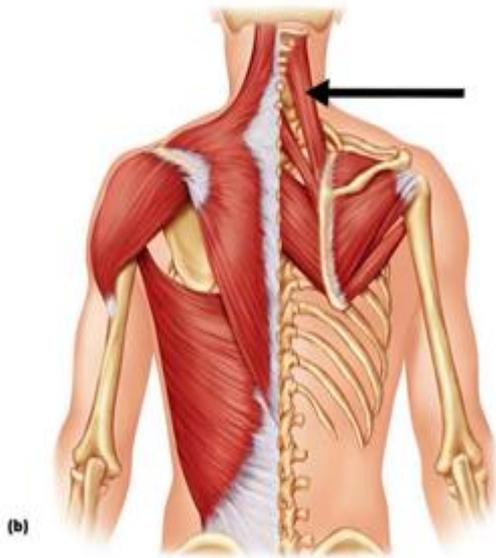
- **Prime mover:** It is the chief muscle responsible for a particular movement e.g. brachialis in elbow flexion.
- **Antagonist:** a muscle that antagonizes the action of the prime mover e.g. triceps during elbow flexion.
- **Fixator:** a muscle that stabilizes the origin of the prime mover or stabilize **the joint** upon which the muscle acts.

For example, the **muscles around the scapula** fix and stabilize the scapula and shoulder joint during contraction of the prime movers acting on the humerus .

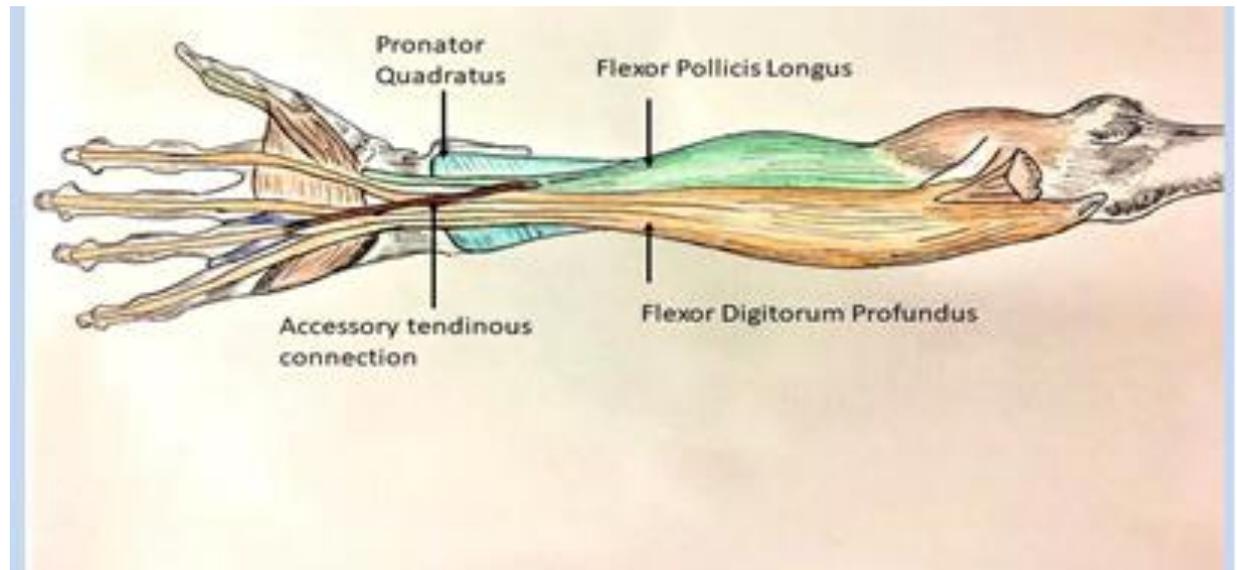
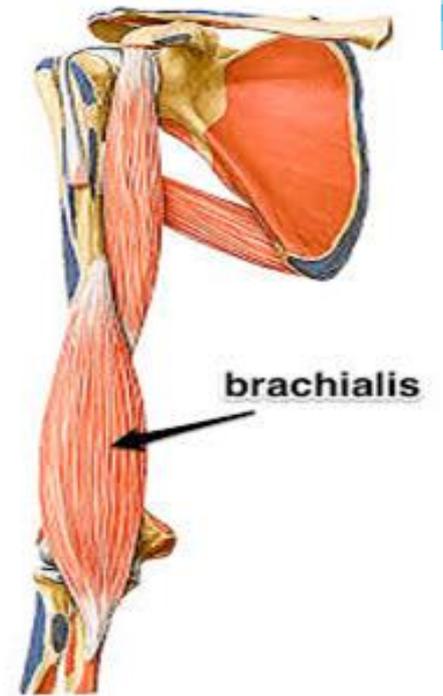
- **Synergist:** Sometimes the prime mover muscle **crosses many joints** before it reaches its insertion.

Synergistic muscles will contract to **eliminate the unwanted movements** at the crossed joints. Therefore, the action of the prime mover on the desired joint becomes maximal.

the extensors of the wrist act during flexion of the fingers to prevent the flexors of the fingers from acting on the wrist.



Muscles around the scapula





Thank you