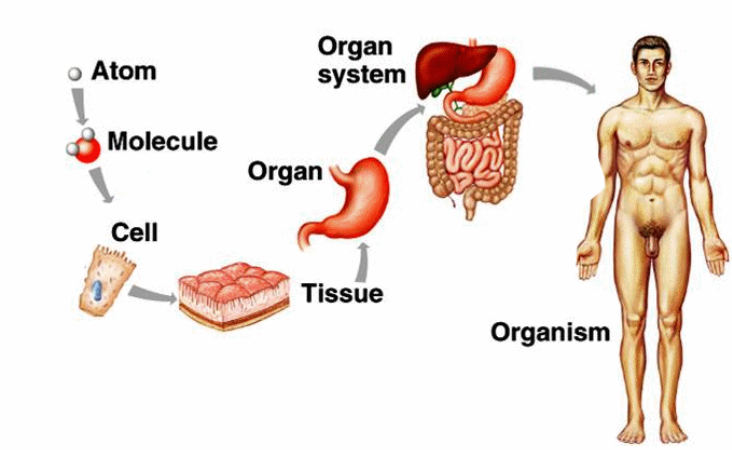
General Anatomy (introduction)

Anatomy is a branch of medicine which deals with structures and shapes. Aspects of anatomy:

- **Gross anatomy**: describing what you see with the naked eye
- **Microscopic anatomy**: histology
- **Developmental anatomy**: embryology
- **Functional anatomy**: physiology

Cell > tissue > organs > systems > human body



- **Tissues:** epithelial, nervous, muscular and connective tissue Functions of the body are controlled by two

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systems: **Nervous system and endocrine system**.

- **Nervous system :** controls body activity

  - **CNS** (brain and spinal cord)

  - **PNS** (12 pairs cranial nerves and 31 pairs spinal nerves and the autonomic nervous system > parasympathetic and sympathetic)

Functional division of the nervous system:

- **Motor: movement**

Somatic: voluntary > skeletal muscles

Visceral: involuntary > smooth muscles, cardiac muscles and glands > autonomic nervous system

- **Sensory:**

General sensation: pain, pressure, touch and temperature (cranial nerves and spinal nerves)

Special sensation: smell, vision, hearing, balance and taste (done by cranial nerves)

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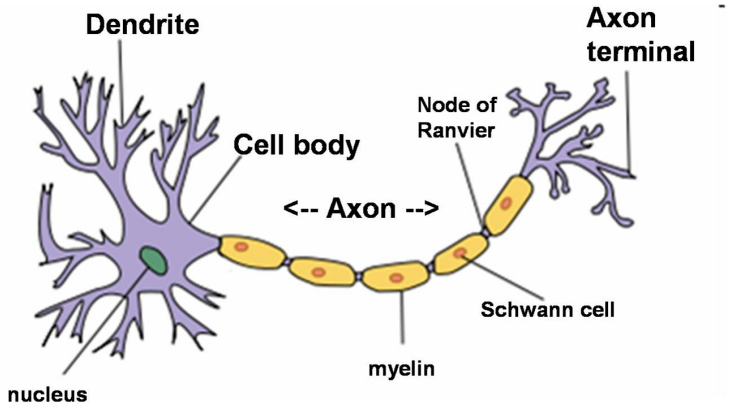
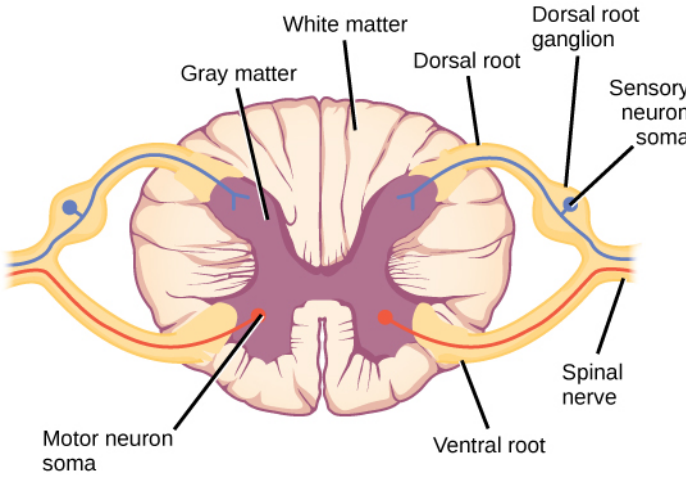


Peripheral nerve: Neuron + glial cells (supportive cells for the protections and suitable environment for the neurons) Neurons can receive information and analyze and send an output. (touching a hot plate reflex) Small processes dendrites (carry the information towards the cell body) and one axon (nerve fiber, information away from the cell body) Many fibers are inside bundles and group of bundles will form peripheral nerve fiber.

If all the fibers are motor we call it pure motor but if they're sensory they're pure sensory or maybe mixed (both sensory and motor) and maybe could have autonomic nervous system fibers too

H shape region > gray matter Right upper corner: dorsal = posterior horn Cells in the posterior horn > sensory neurons Dorsal root > nerve fibers of sensory Dorsal root ganglion in the dorsal root

Right lower corner: ventral = anterior horn Cells in the anterior horn > motor neurons Ventral root > nerve fibers of motor



Cross Section of Spinal Cord

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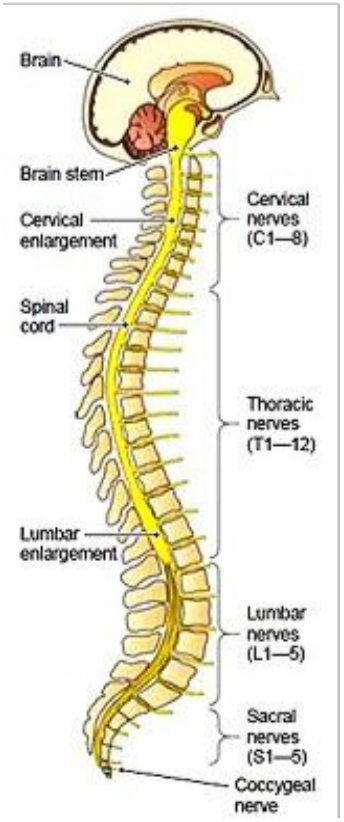
The two roots join together and form the spinal nerve.

After they join they divide again into two:

- **Dorsal Ramus** : motor and sensory
- **Ventral Ramus** : motor and sensory



31 pairs of spinal nerves: (initials) C4, T6 (ex.)

8 in the neck - Cervical

12 in the chest – Thoracic, Dorsal

5 in the lower back – Lumbar

5 in the pelvis – Sacral

1 in the pelvis – Coccygeal

The dorsal rami of the spinal nerves they supply the back of the body (skin and muscles) The ventral rami from:

- C1-C4 they form the cervical plexus (the neck)
- C5-C8 and T1 they form the brachial plexus (the muscles of the upper limb)
- L1-S4 – lumbosacral plexus (lower limbs and pelvis structures)
- T2-T12 > intercostal nerves

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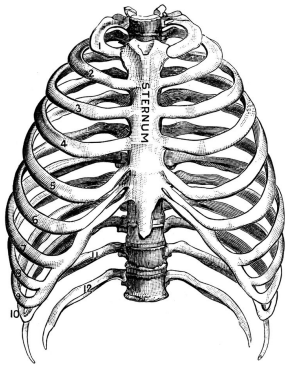


The space between two ribs > intercostal space We have muscles there > intercostal muscles that need nerves (intercostal nerve to the muscle between the ribs)

Muscles:

- Skeletal: voluntary and striated
- Smooth: involuntary and non-straited
- Cardiac: involuntary, striated, and branched
- Function of muscles:

  Movement

  Generation of heat

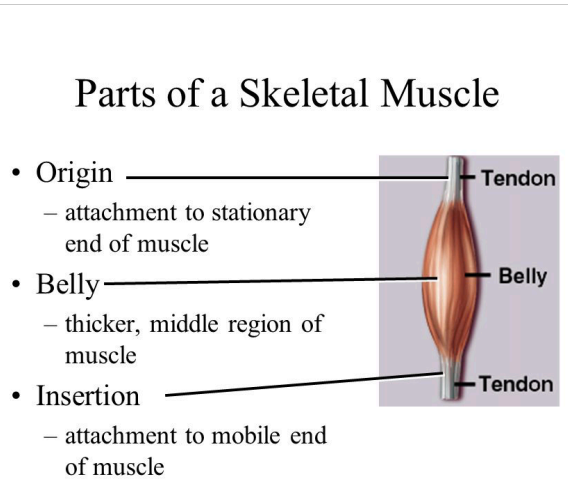
Skeletal muscles:

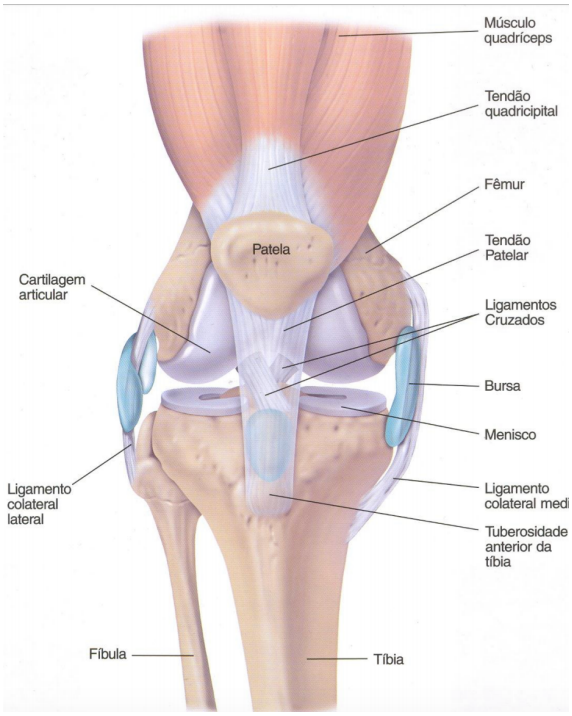
The belly of the muscle > rich in protein and it's located in the middle The end of the muscle > grey and white because it contains a lot of fibers > tendons

Where the muscle starts > origin (immovable) Where the muscle ends > insertion (movable) A single muscle can have more than one origin and one insertion

Ligaments: fibro-span fibro structure that connects bones together or two parts The muscle has to cross the joint to make a movement

Bursa: synovial structure which reduce friction force so the ligaments aren't damaged.





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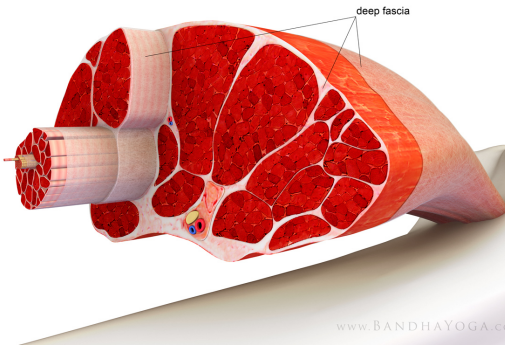
How do we name muscles?

By the attachment, number of heads (biceps , triceps and quadriceps) size of the muscle (major and minor), function (flexor or intense), arrangement of fibers (rectus, oblique, transverse), location (temporalis muscle)

Fascia : connective tissue layer surrounds structures > if there's large spaces it divides big spaces into small spaces and surrounds structures to limit the spread of diseases and infections.

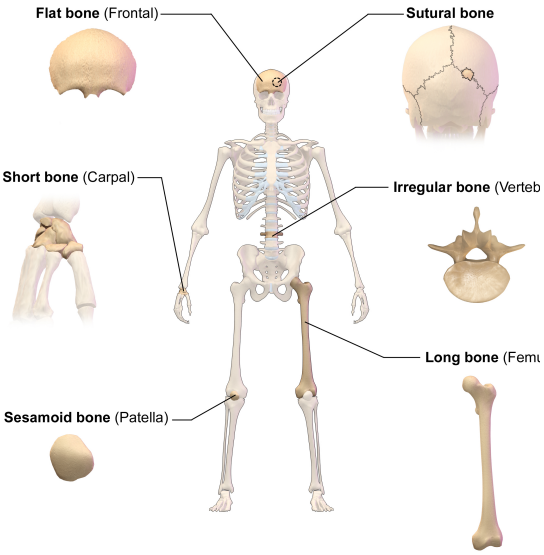


- superficial beneath the skin
- Deeper layer deep fascia

Bones: connective tissue structure. Skeleton **> Axial** (skull and vertebral column/ one only) and **Appendicular** (upper limbs and lower limbs/ two periphery) Function of bones: stores minerals, support, protection and movement. They're covered with transparent membrane called periosteum and it's rich with nerves (sensitive area)

Types of bones:

- Long (upper limbs and lower limbs)
- Irregular (vertebrae, hip bone)
- Short (wrist bones)
- Flat (skull, sternum)



Classification of Bones by Shape

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Another type is :

- **Pneumatic bone :** air filled bones (a cavity inside the bone) ex.maxilla and paranasal sinuses (surrounding the nose) is a type of pneumatic bone but not all pneumatic bones are paranasal sinuses

- **Sesamoid bone :** bone layer within the tendon of skeletal muscle in the middle of the tendon ex. Patella (largest Sesamoid)

Joints:

- **Immovable joint :** bony joint (hip bone made of three bones together ilium, pubis, ischium
- **Relatively movable** (little movement) : fibrous (ligaments that connect two bones) or fibrocartilaginous bones (intervertebral disc)
- **Freely movable joint** : synovial joints (each bony end is covered with thin layer of articular cartilage and a membrane called synovium membrane. A space between the membrane and the joint filled with synovial fluid. And the fluid is produced by the synovium to lubricate the bone surface. It allows free movement without damaging bony surfaces. The whole thing is surrounded by **fibrous capsule**.

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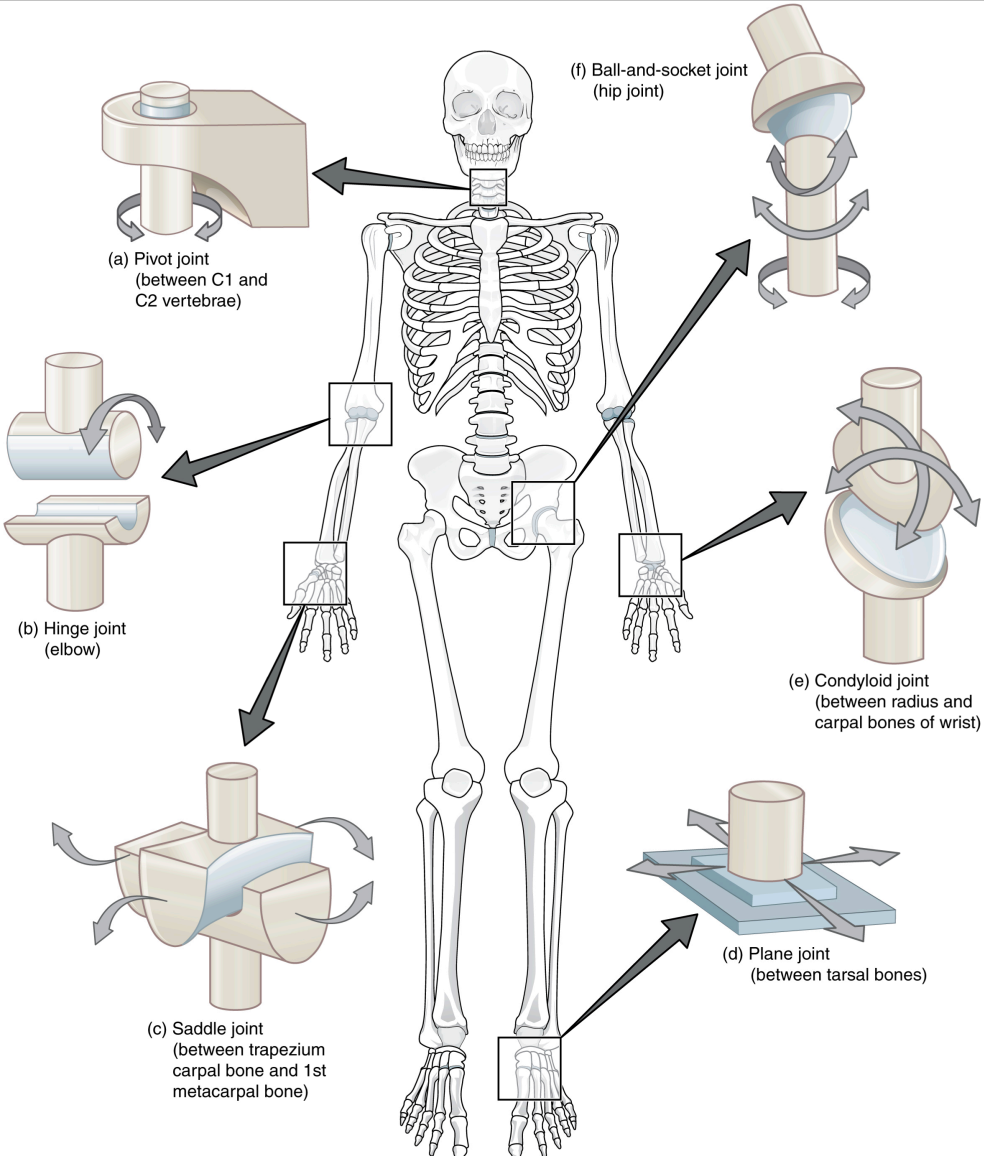
Types of synovial joints:

- **ball and socket:** allows multiple movements in a wide range and a multiple direction ex shoulder. On the side of hip bone we have a cavity (socket) in the shoulder as well, allows one type of movements and different types of movements.
- **The hinge:** uniaxial movement with a limited range ex. Knee joint elbow
- **Pivot**: rotation movement, ex. Joint between C1 and C2
- **Plane:** two flat surfaces sliding movement ex. Joint between clavical and sternum



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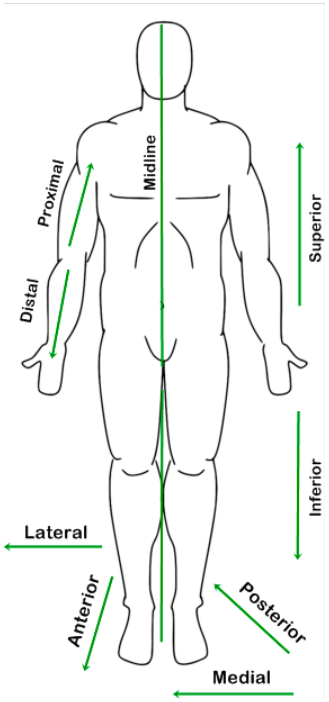
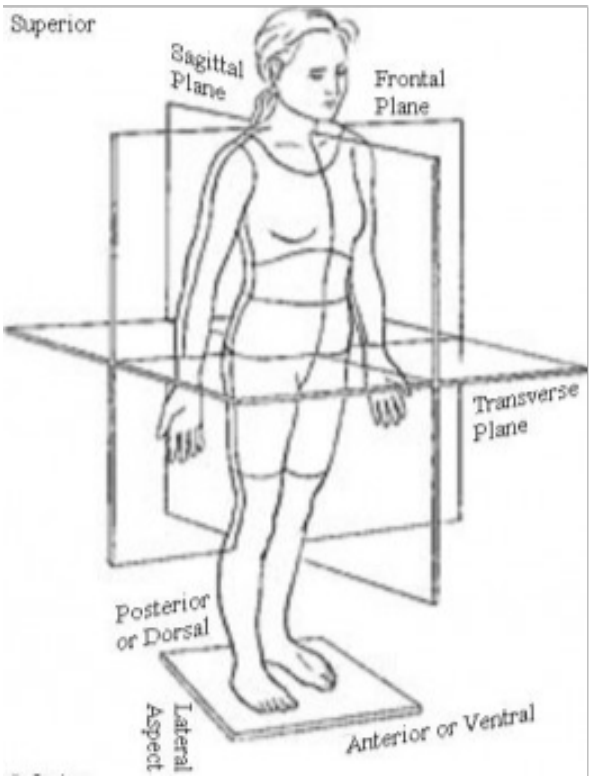
Anatomical terms of movements:

- Anterior : front, ventral
- Posterior : back, dorsal
- Lateral
- Medial
- Superior : cephalic, upper close to the head
- Inferior : lower close to the feet, caudal
- Superficial
- Deep
- Proximal : close to the origin
- Distal : away from the origin



Planes:

- Transverse or cross section (upper and lower)
- Saggital (right and left) in the midline > midsaggital
- Coronal or frontal (anterior and posterior)



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