بِسْمِ اللَّهِ الرَّحْمَٰنِ الرَّحِيمِ

ANATOMY

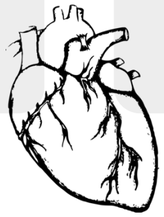
وَلَقَدْ خَلَقْنَا الْإِنسَانَ وَنَعْلَمُ مَا تُوَسْوِسُ بِهِ نَفْسُهُ ۖ وَنَحْنُ أَقْرَبُ إِلَيْهِ مِنْ حَبْلِ الْوَرِيدِ

MID | Lecture 1

Introduction to Anatomy

Written by : Yamen Aljarrah
Yaman Khalil

Reviewed by : Rand Alkhateeb



Introduction to Anatomy

1st year Medical Students

2025-2026
Second Semester

Dr. Abedallah Hamida, MBBS, PhD

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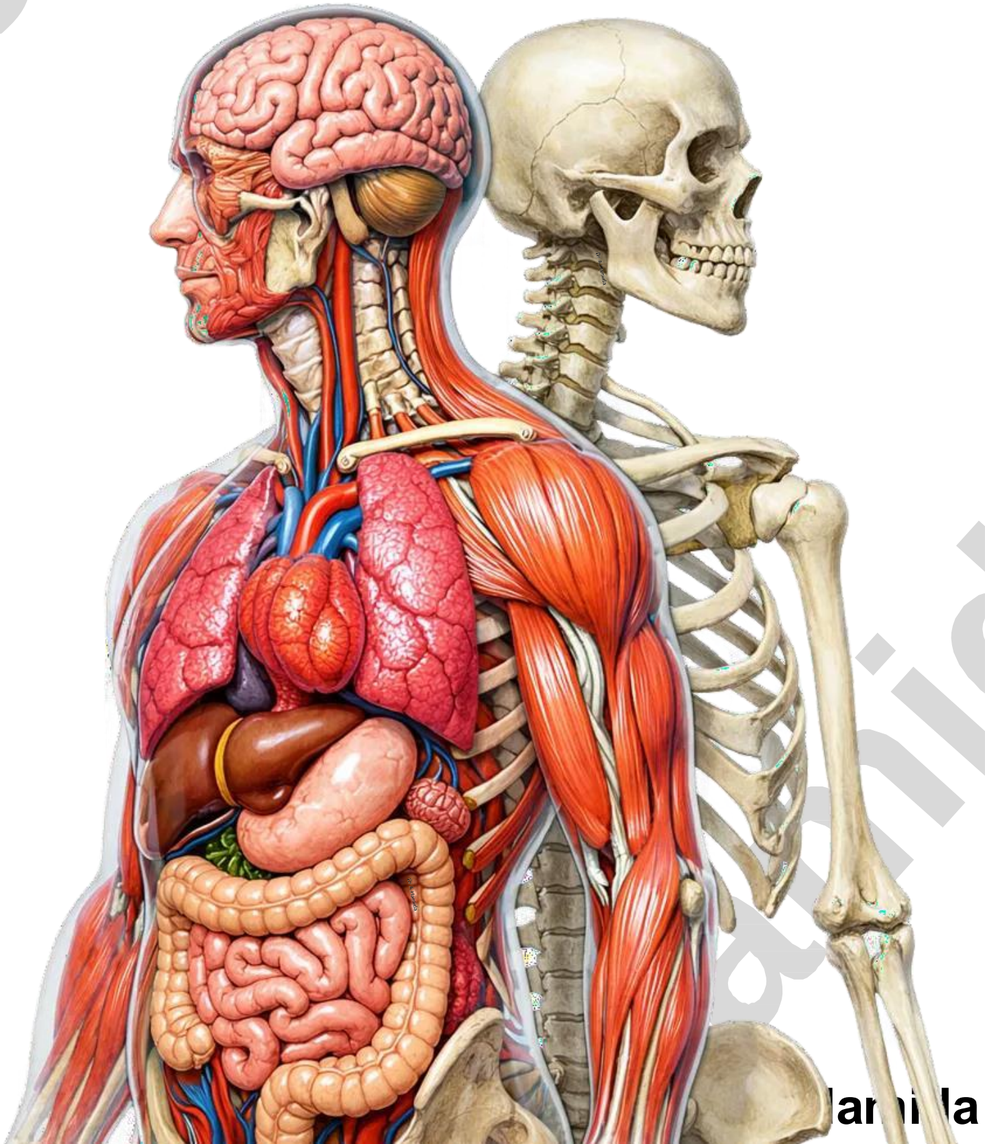


Gross lecture-1

What is Anatomy?

Greek

UP

Cut

Cut up = Process of Cutting = Dissection

is the science of body structures and the relationships among them

Why We Learn Anatomy?

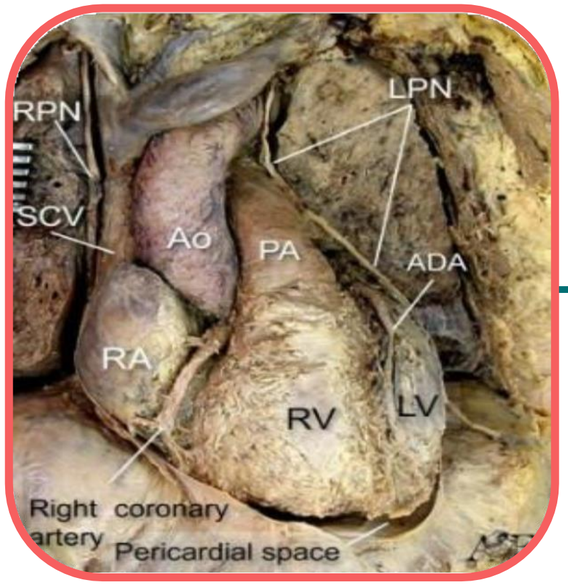
Foundation of Medical Science

Provides the basic knowledge required to understand function (physiology), disease (pathology), or treatment (pharmacology, surgery).

Language of Medical Science

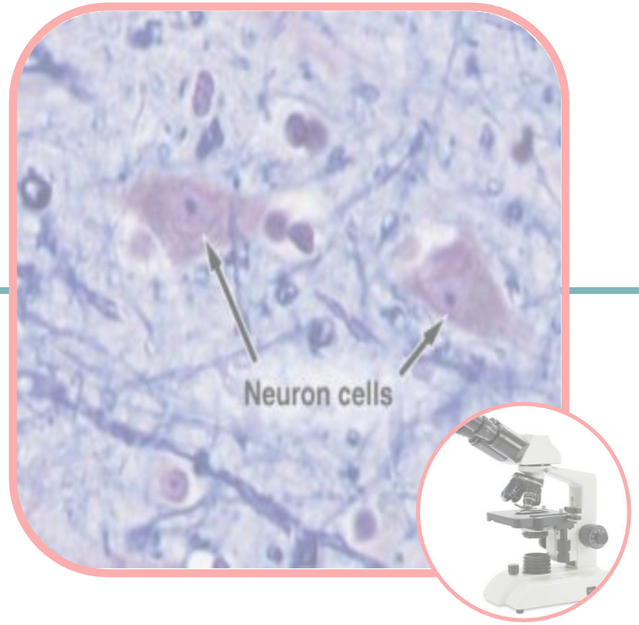
Gives the terms, locations, and structures that all healthcare professionals use, so you can communicate clearly about conditions and treatments.

Subdivisions of Anatomy?



Macroscopic Anatomy (Gross Anatomy)

Study of the larger structures of the body in cadavers through dissection and direct observation with the naked eye.



Microscopic Anatomy (Histology)

Study of body structures that cannot be seen with the naked eye (only with the use of a microscope.

Developmental Anatomy (Embryology)

Study of the intrauterine development of an individual, from fertilization to birth.

Gross Anatomy

Gross anatomy is studied through two primary methods:

Regional Anatomy

All the structures in a particular region of the body are studied at the same time.

(deals with several systems located in a particular region of the body)

Systemic Anatomy

All the structures/organs forming a particular system are studied together at the same time.

Body Regions

➢ Principal regions of the body:

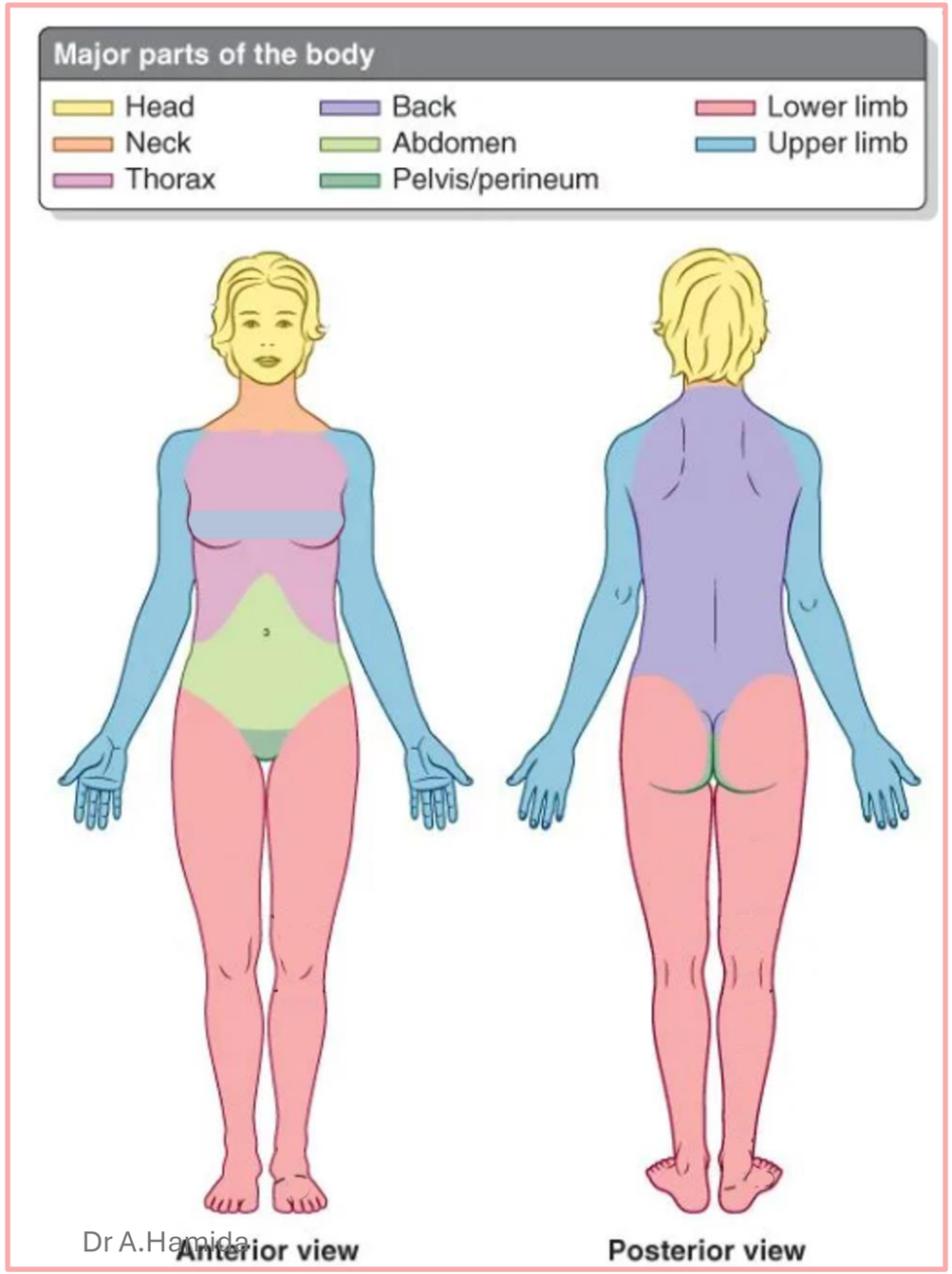
1. Head.
2. Neck.
3. Trunk:

   (i) Thorax (chest)

   (ii) Abdomen

   (iii) Pelvis

   (iv) Back
4. Upper Limb/Extremity.
5. Lower Limb/Extremity.

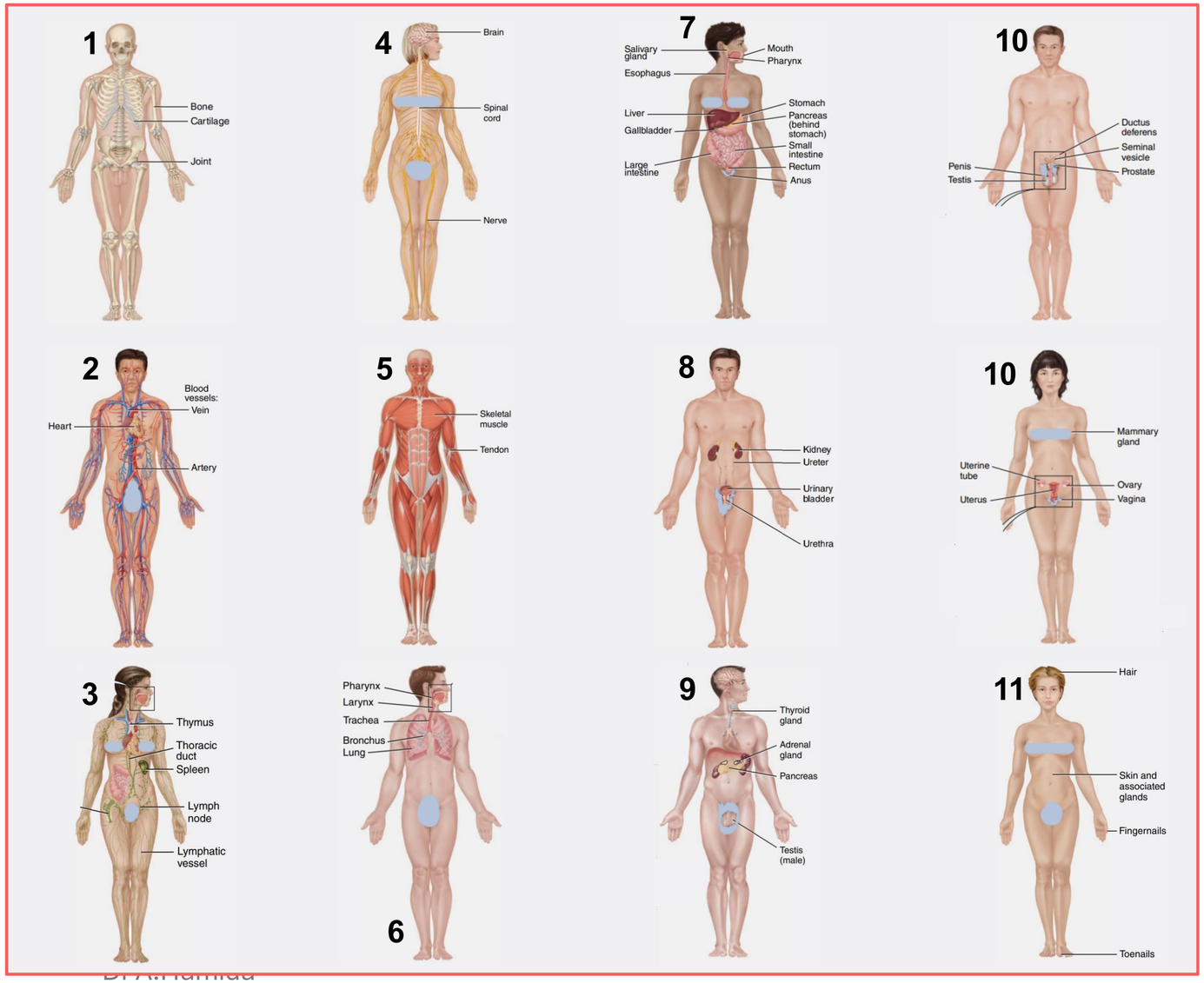


Body Systems

Gross lecture-1

➢ Principal Systems of the body:

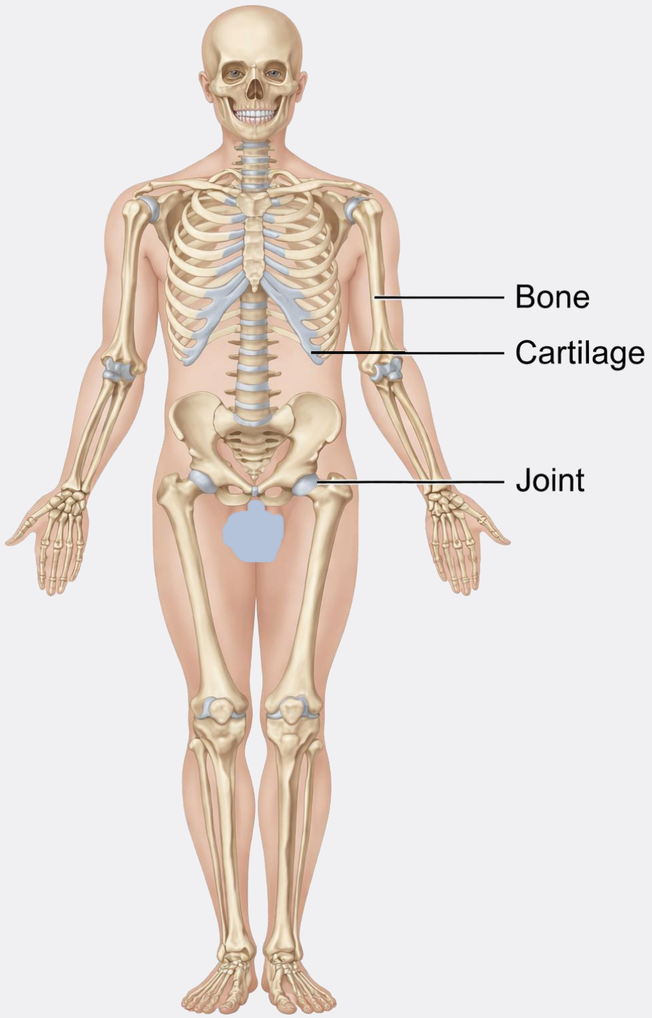
1. Skeletal System.
2. Cardiovascular System.
3. Lymphatic System.
4. Nervous System.
5. Muscular System.
6. Respiratory System.
7. Digestive System.
8. Urinary System.
9. Endocrine System.
10. Reproductive System. We will cover at the embryology course
11. Integumentary System. We will cover at the histology course



Body Systems

➢ Principal Systems of the body:

1. Skeletal System



Components:

- **Bones and joints of the body and their associated cartilages**

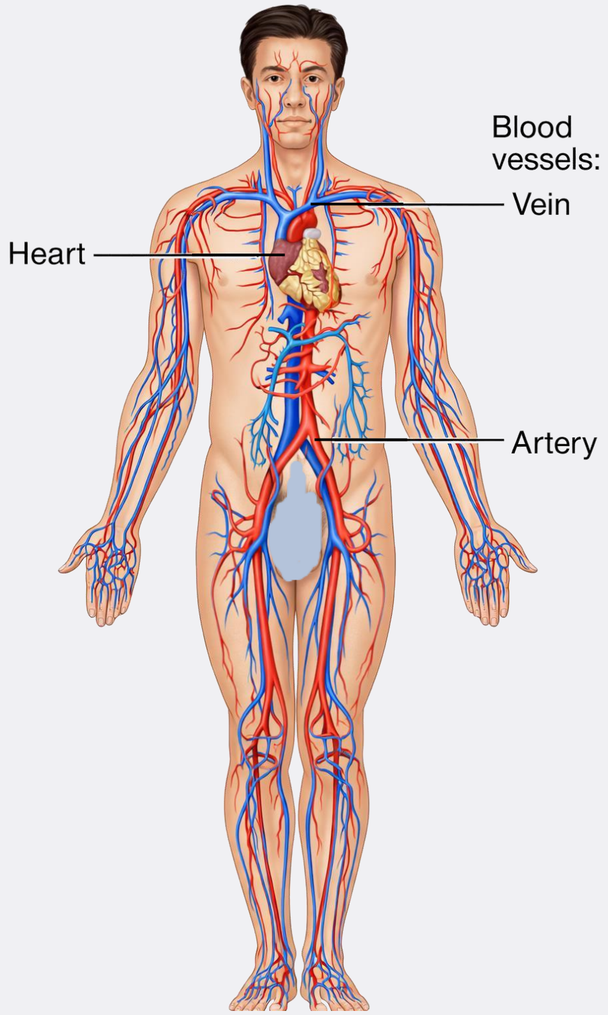
Functions:

- **Supports and protects body;**
- **Provides surface area for muscle attachments;**
- **Aids body movements;**
- **Houses cells that produce blood cells;**
- **Stores minerals and lipids (fats)**

Gross lecture-1

➢Principal Systems of the body:

2. Cardiovascular System



Components:

- **Blood, heart, and blood vessels**

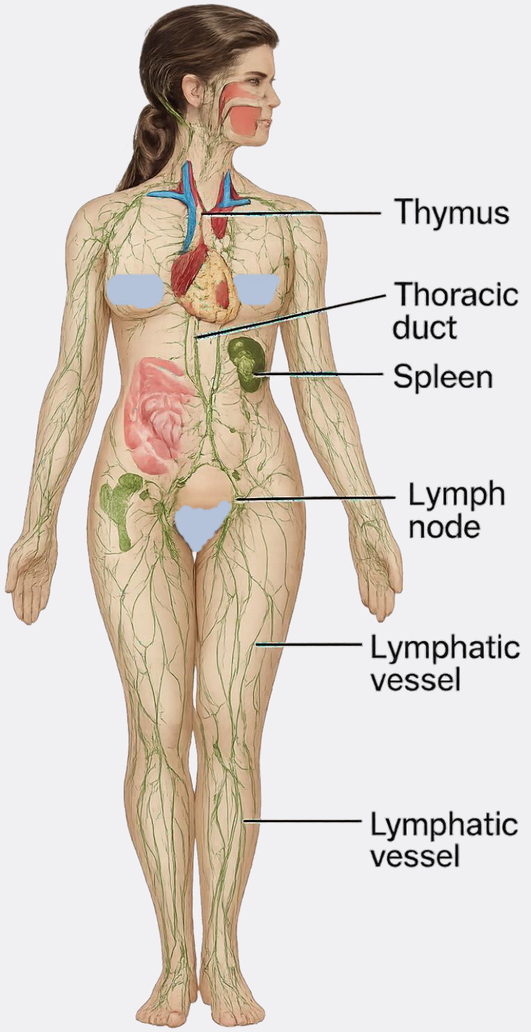
Functions:

- **Heart pumps blood through blood vessels;**
- **Blood carries oxygen and nutrients to cells and carbon dioxide and wastes away from cells**

Gross lecture-1

➢Principal Systems of the body:

3. Lymphatic System



Components:

- **Lymphatic fluid and vessels; spleen, thymus, lymph nodes, and tonsils**

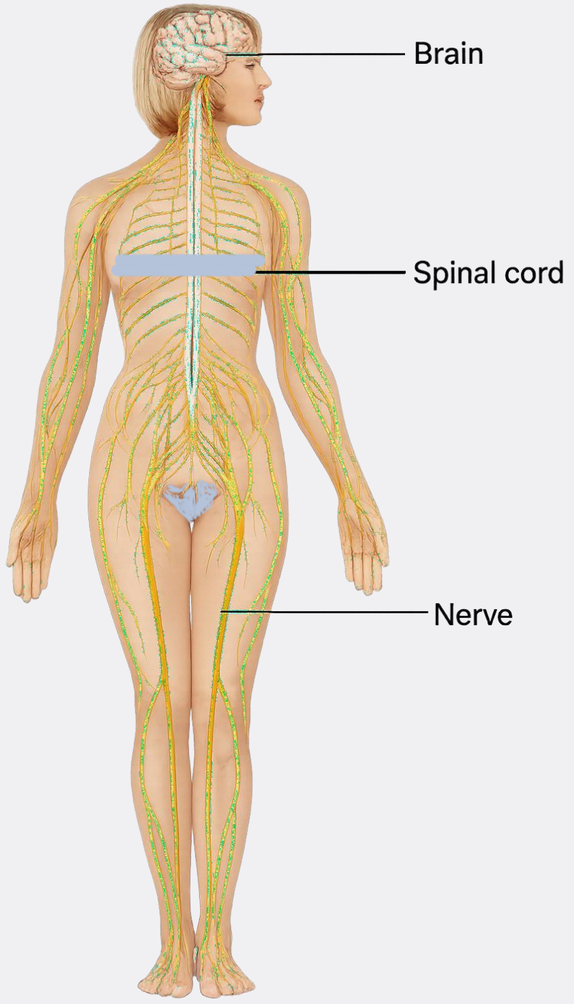
Functions:

- **Returns proteins and fluid to blood;**
- **Contains sites of maturation and proliferation of B cells and T cells that protect against disease-causing microbes**

Gross lecture-1

➢ Principal Systems of the body:

4. Nervous System



Components:

- **Brain, spinal cord, nerves, and special sense organs, such as eyes and ears.**

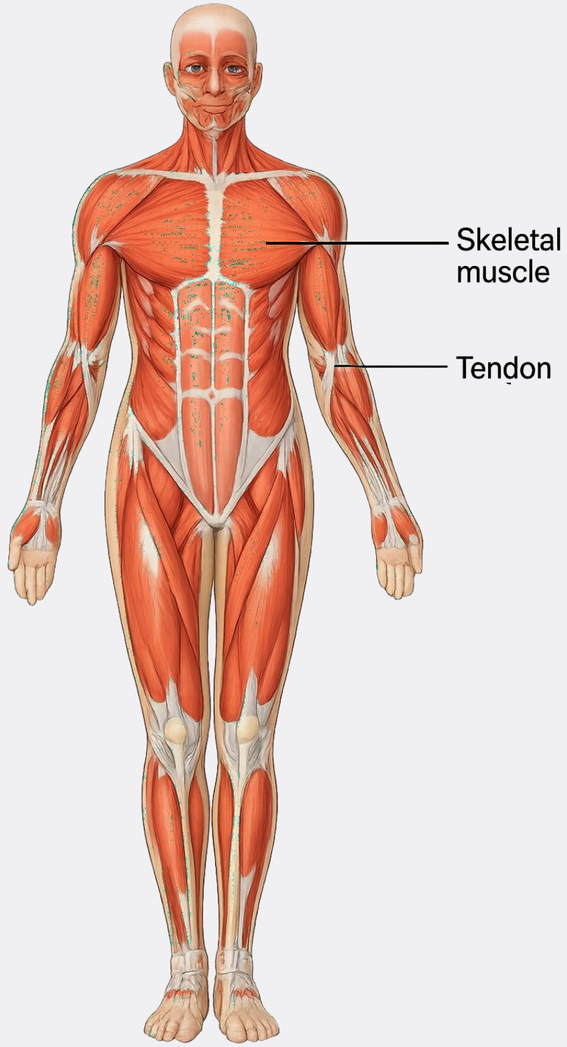
Functions:

- **Generates action potentials (nerve impulses) to regulate body activities;**
- **Interprets changes, and responds by causing muscular contractions or glandular secretions.**

Gross lecture-1

➢ Principal Systems of the body:

5. Muscular System



Components:

- **Skeletal muscle tissue.**

Functions:

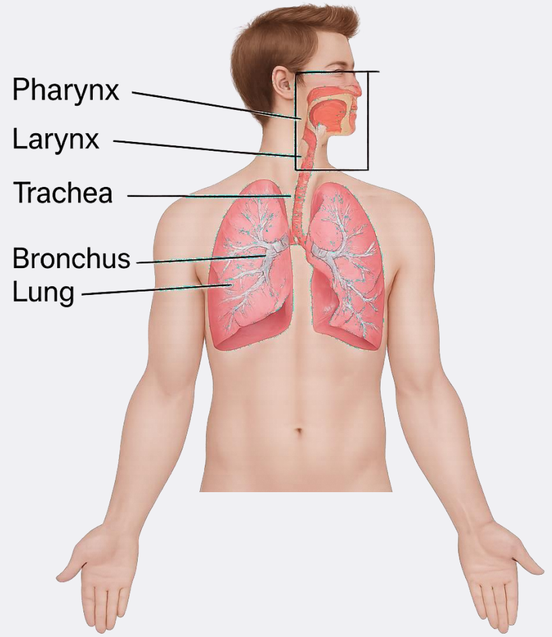
- **Participates in body movements, such as walking;**
- **Maintains posture;**
- **Produces heat**

Body Systems

Gross lecture-7

➢ Principal Systems of the body:

6. Respiratory System



Components:

- **Lungs and air passageways such as the pharynx, larynx, trachea, and bronchial tubes**

Functions:

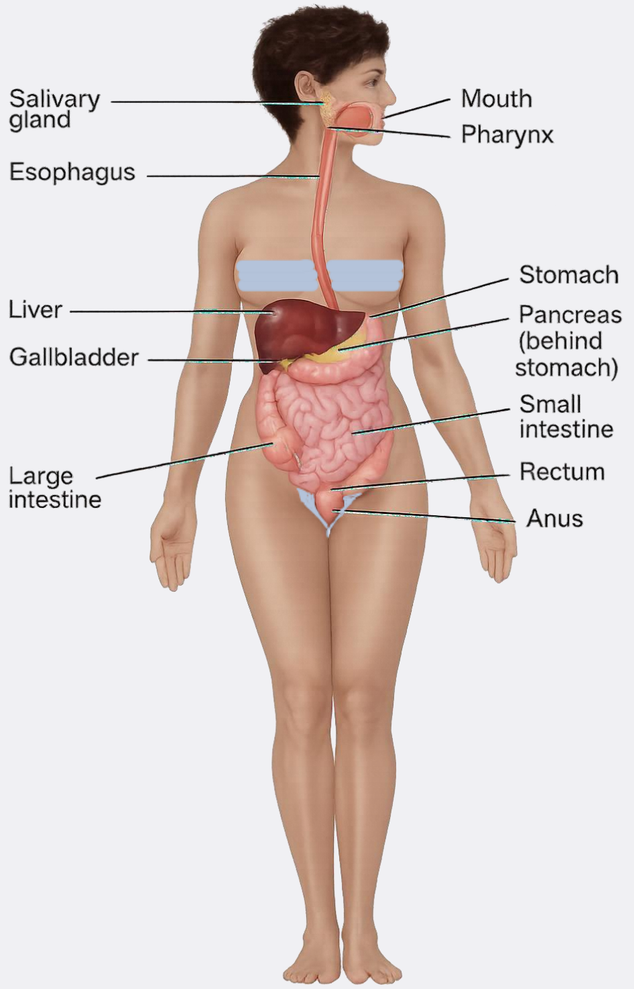
- **Transfers oxygen from inhaled air to blood and carbon dioxide from blood to exhaled air;**
- **Air flowing out of lungs through vocal cords produces sounds**

Body Systems

Gross lecture-7

➢ Principal Systems of the body:

7. Digestive System



Components:

- **Organs of gastrointestinal tract, that includes the mouth, pharynx, esophagus, stomach, small and large intestines, and anus;**
- **Accessory organs that assist in digestive processes, such as salivary glands, liver, gallbladder, and pancreas**

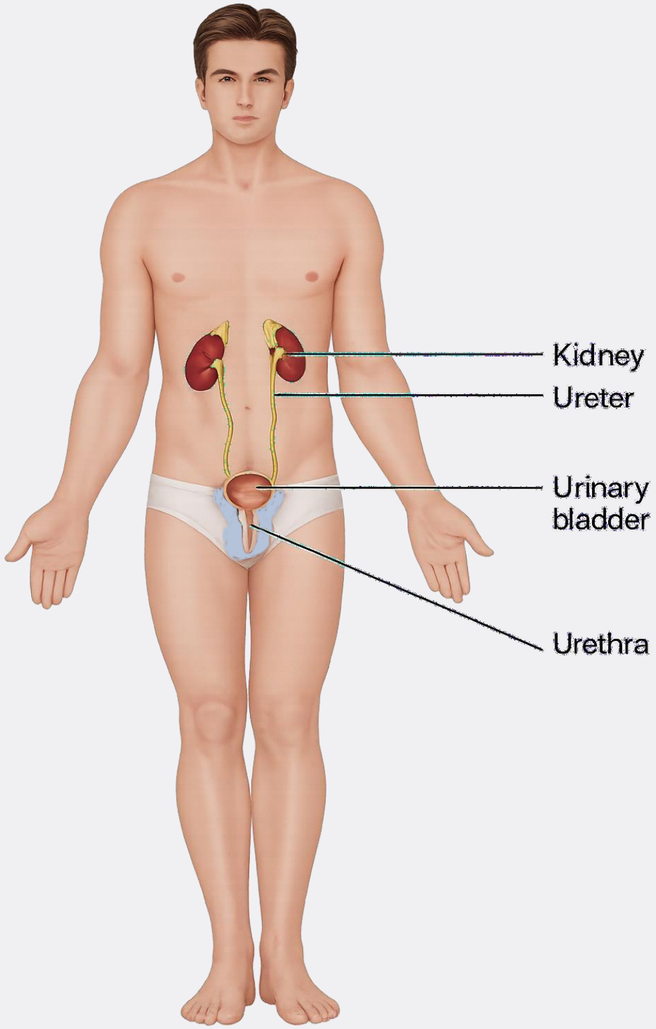
Functions:

- **Achieves physical and chemical breakdown of food;**
- **Absorbs nutrients**

Gross lecture-7

➢ Principal Systems of the body:

8. Urinary System



Components:

- **Kidneys, ureters, urinary bladder, and urethra**

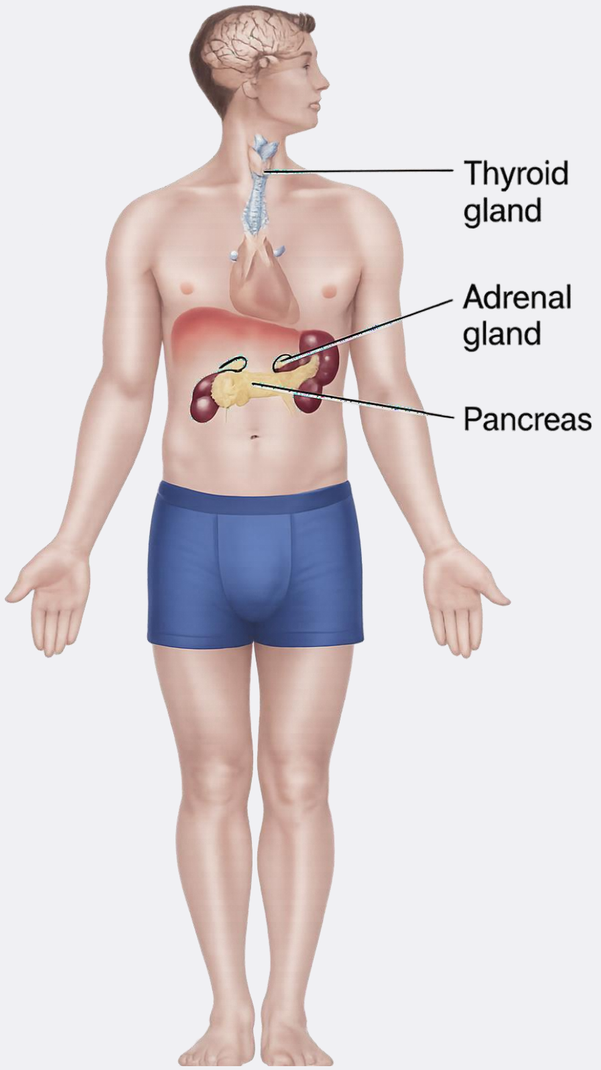
Functions:

- **Produces, stores, and eliminates urine;**
- **Helps maintain the acid–base balance of body fluids;**
- **maintains body's mineral balance**

Gross lecture-7

➢ Principal Systems of the body:

9. Endocrine System



Components:

- **Hormone-producing glands (pineal gland, hypothalamus, pituitary gland, thymus, thyroid gland, parathyroid glands, adrenal glands, pancreas, ovaries, and testes)**

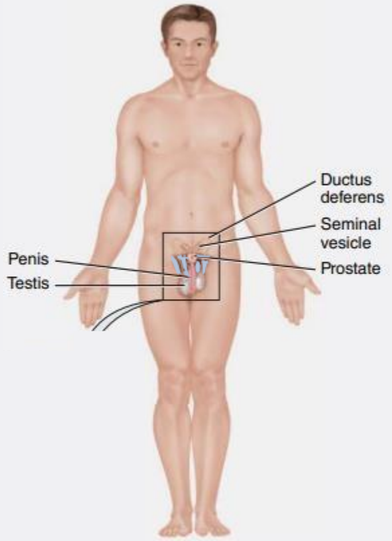
Functions:

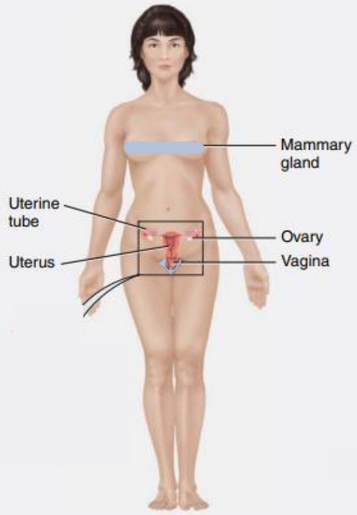
- **Regulates body activities by releasing hormones (chemical messengers transported in blood from endocrine gland or tissue to target organ)**

Gross lecture-7

➢ Principal Systems of the body:

10. Reproductive System





Components:

- **In males: testes, epididymis, ductus or (vas) deferens, seminal vesicles, prostate, and penis.**
- **In females: ovaries, uterine tubes or fallopian tubes, uterus, vagina, and mammary glands.**

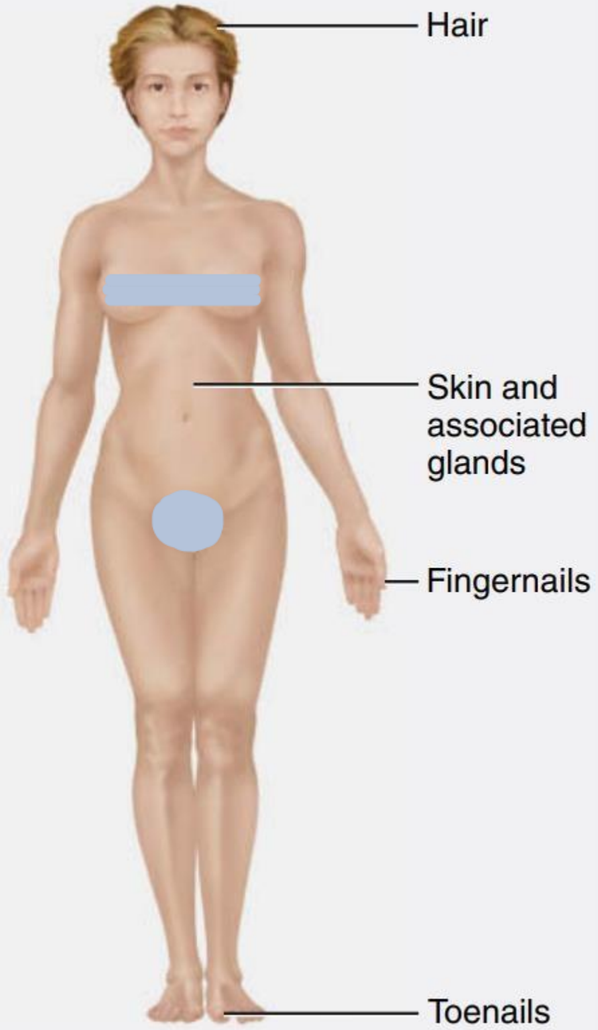
Functions:

- **Produce gametes (sperm or oocytes) that unite to form a new organism;**
- **Release hormones that regulate reproduction and other body processes**

Body Systems

➢ **Principal Systems of the body:**

11. Integumentary System



Components:

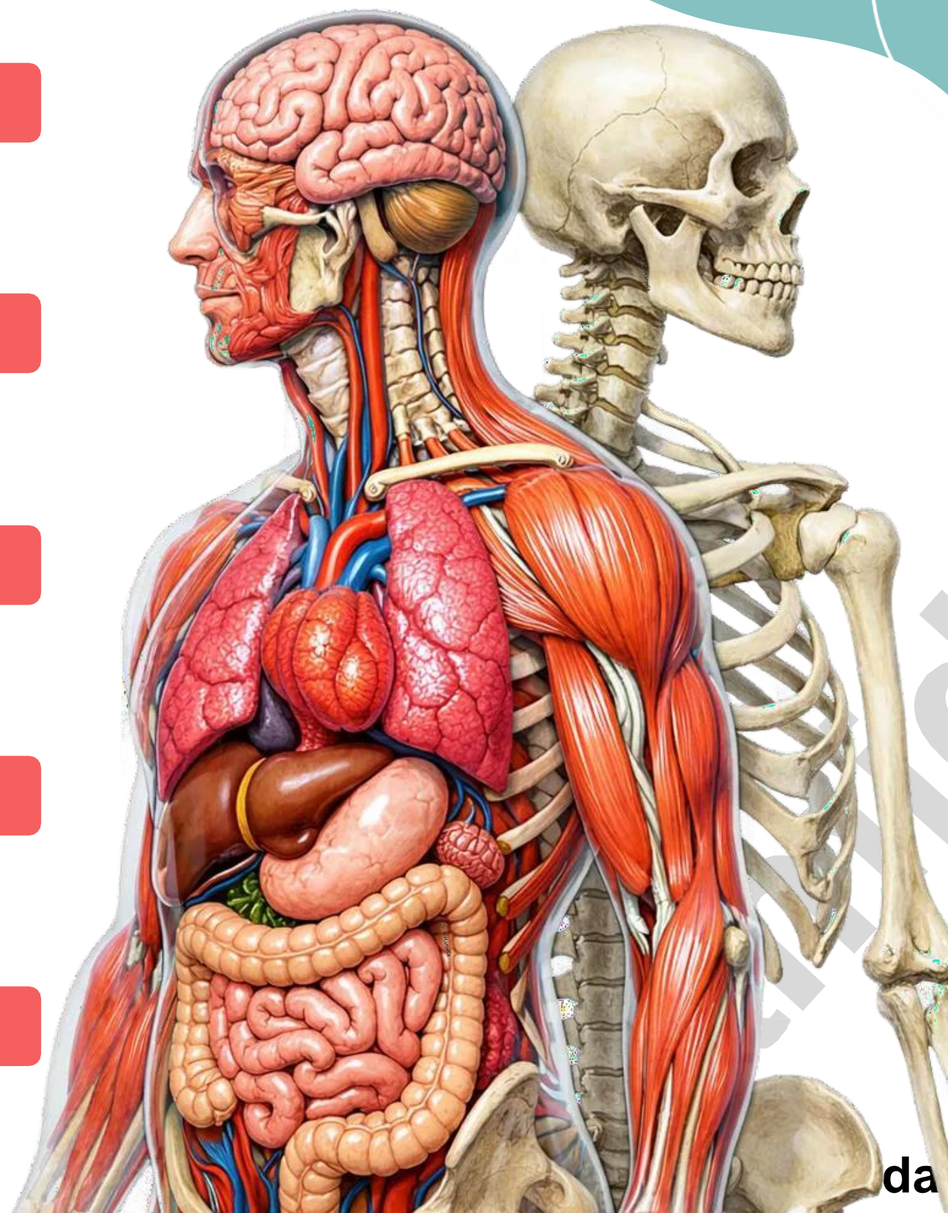
- **Skin and associated structures, such as hair, fingernails and toenails, and sweat glands.**

Functions:

- **Protects body;**
- **Helps regulate body temperature;**
- **Helps make vitamin D;**
- **Detects sensations such as touch, pain, warmth, and cold;**

Course Outline:

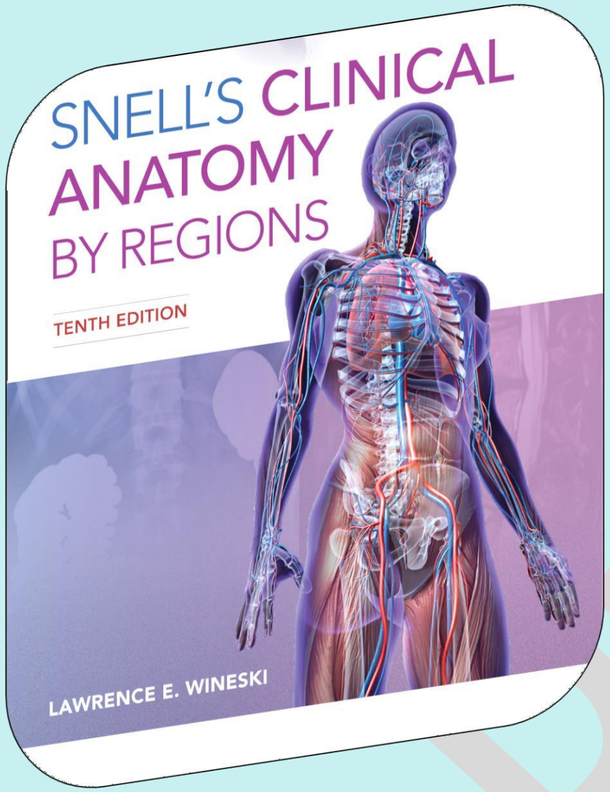
1. Introduction and Terminology
2. Skeletal System
3. Cardiovascular System
4. Lymphatic System
5. Nervous System
6. Muscular System
7. Respiratory System
8. Digestive System
9. Urinary System
10. Endocrine System



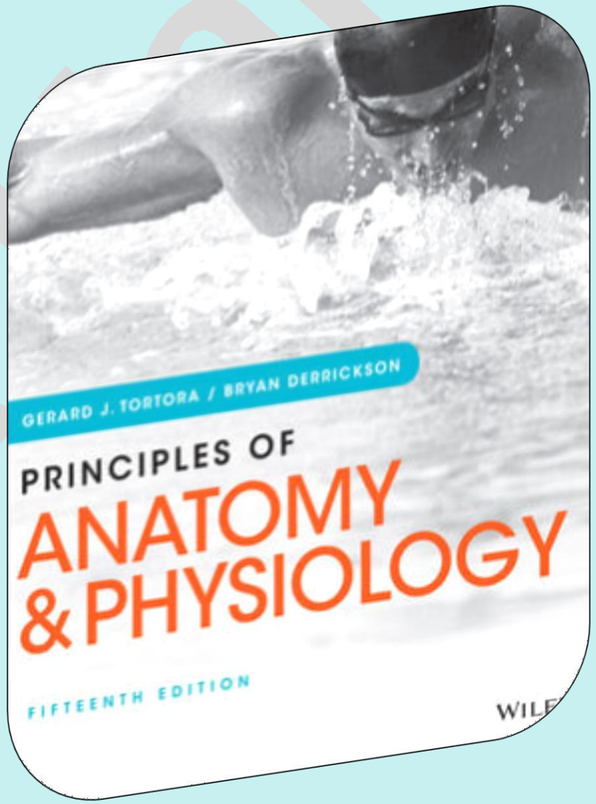
Resources: Books

Gross lecture-1

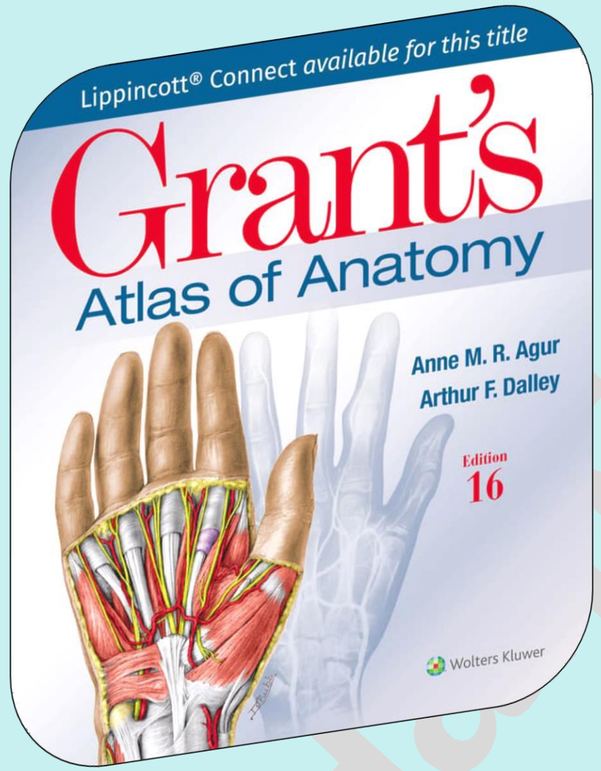
Snell's Clinical Anatomy



Tortora Principles of Anatomy and Physiology



Grant's Atlas of Anatomy



Resources: Online

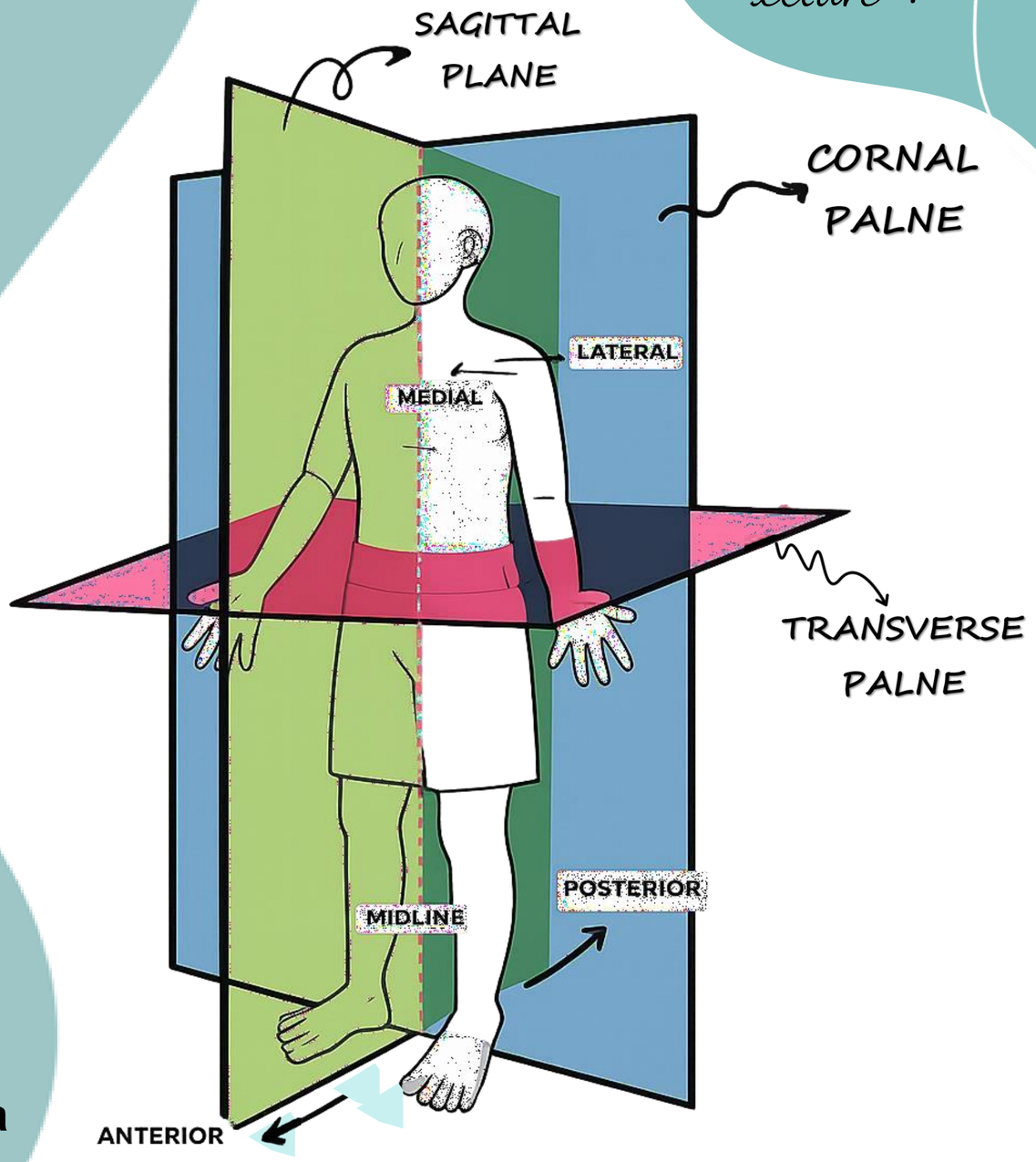
E-learning JU

Dr A.Hamida

1

Gross lecture-1

Introduction and Terminology



Dr A.Hamida

1 Introduction and Terminology

Gross lecture-1

Lecture Outline:

1.1 Anatomical Position

1.2 Anatomical Planes

1.3 Directional Terms

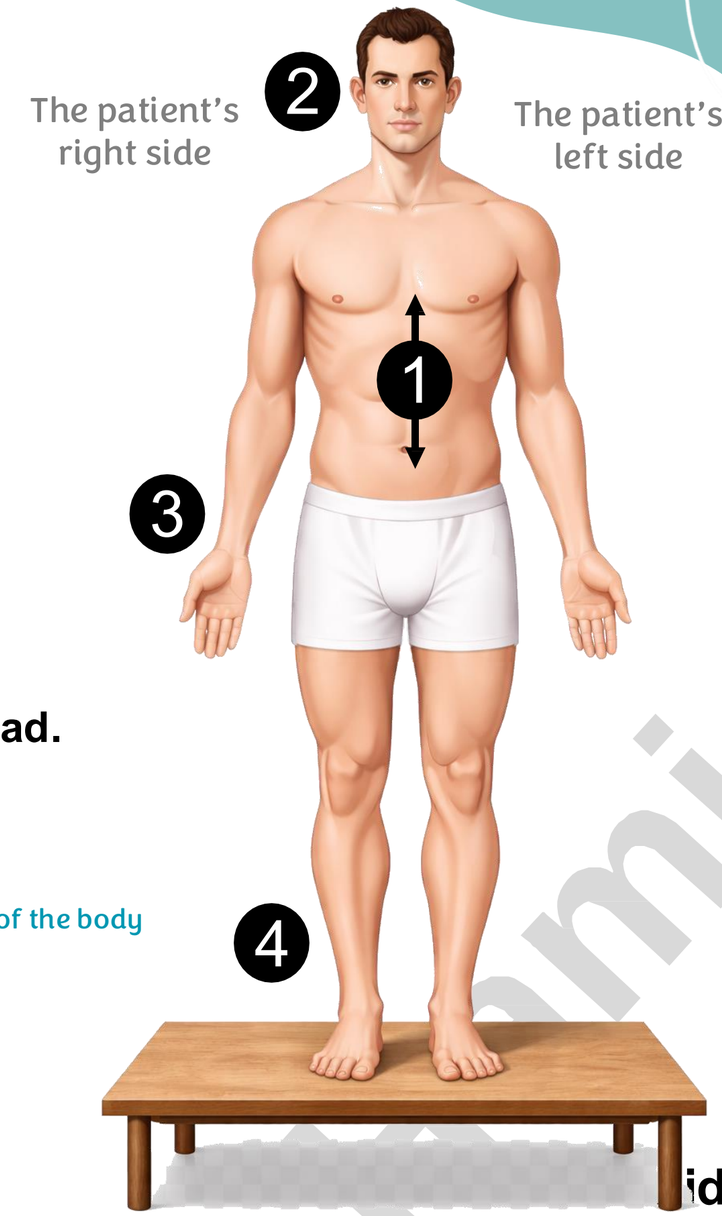
1.4 Body Cavities

1.5 Body Cavity Membranes

1.1 Anatomical Position

Gross lecture-7

- It is the universally standard position that medical professionals use to communicate information concerning parts of the body.
- One must visualize this position in the mind when describing patients (or cadavers), whether they are lying on their sides, supine or prone.



- In Anatomical Position:

1. The body stands erect.
2. The head is upright, and the eyes are directed forward, looking straight ahead.
3. The upper limbs are at the side of the body with the palms facing forward, the fingers extended downward, and the thumbs pointing <u>laterally</u>. Facing away of the body
4. The lower limbs are parallel, with the feet flat on the floor and the toes pointing <u>forward</u>.

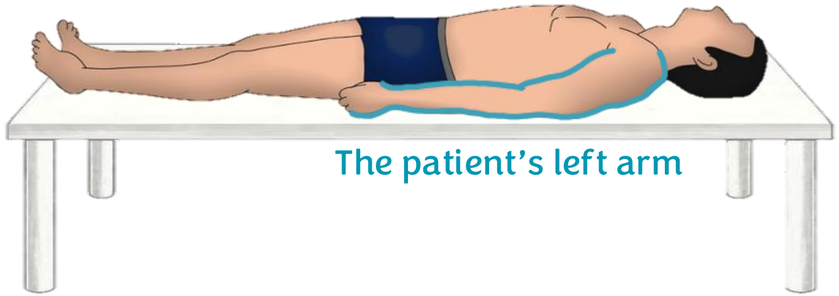
Anatomical Position

Gross lecture-7

➢ Other Positions of the body:

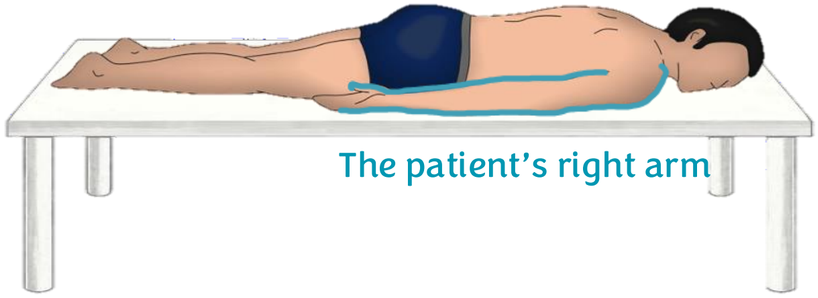
1. Supine Position:

The person lies on the back with face directed upwards.



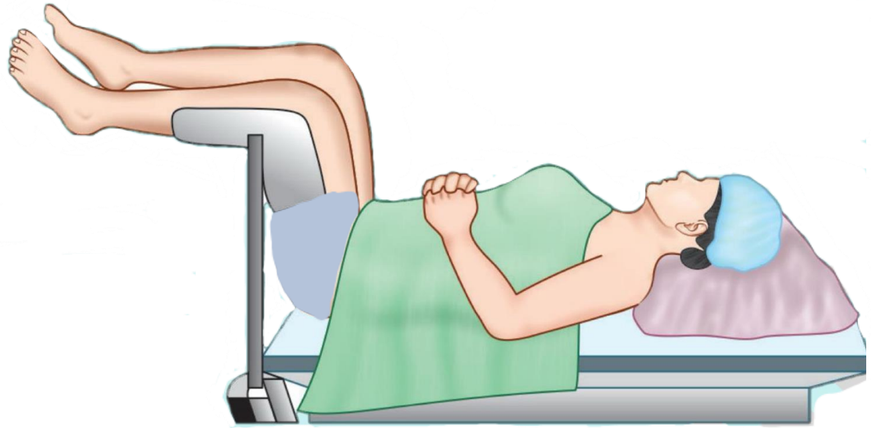
2. Prone Position:

The person lies on his belly (abdomen) with his face directed downwards.



3. Lithotomy Position:

The person lies supine with buttocks at the edge of the table; the hips and knees are semi-flexed and the thighs are abducted.



Dr A.Hamida

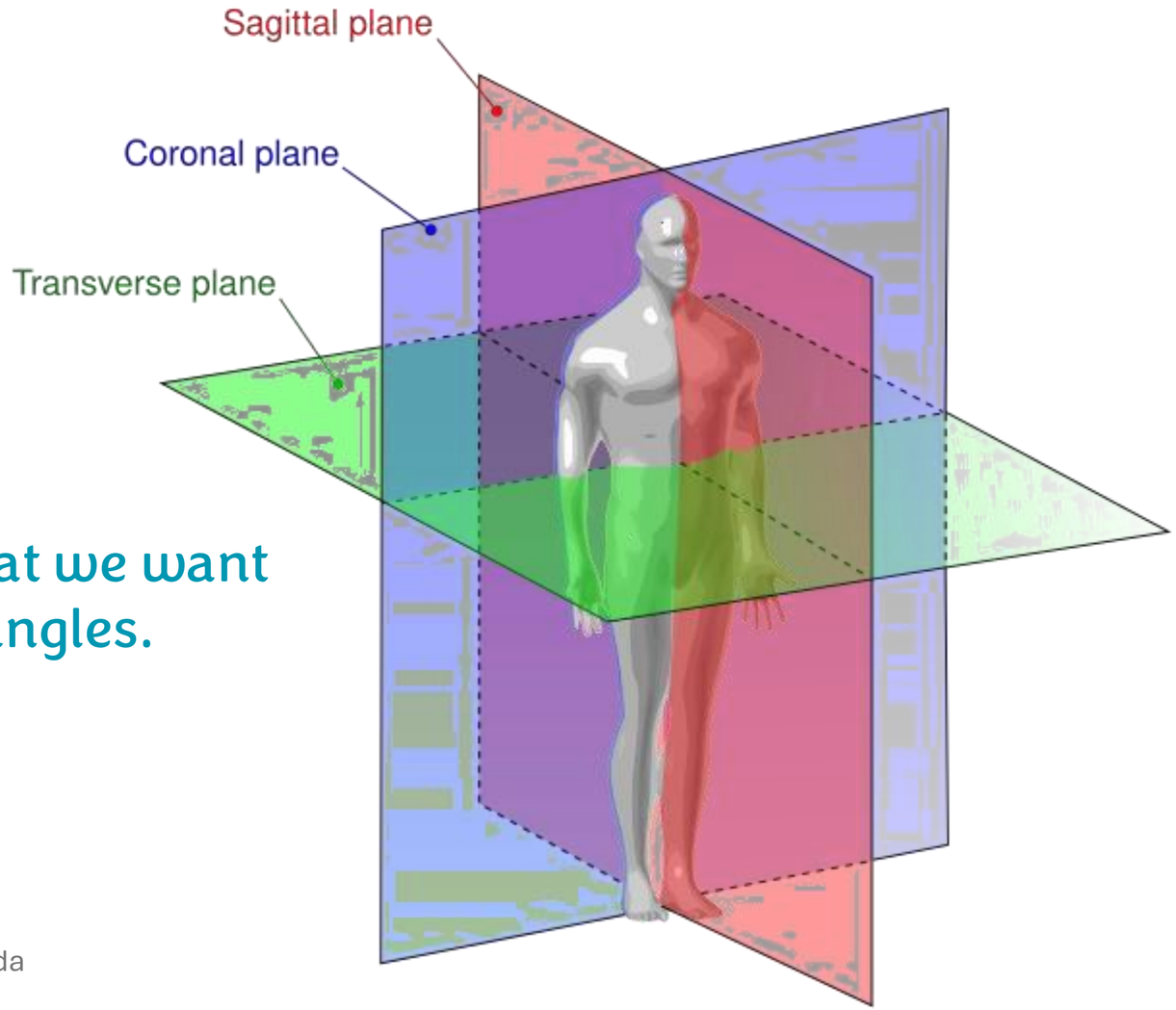
1.2 Anatomical Planes

Gross lecture-1

- A plane is an imaginary flat surface that passes through the body or an organ.

- Commonly used planes in anatomy and medicine:

1. Sagittal Plane.
2. Coronal Plane (Frontal Plane).
3. Transverse Plane (Horizontal Plane).



We use these planes to divide the structures that we want to study in order to view them from different angles.

1.2 Anatomical Planes

Gross lecture-7

1. Sagittal Plane:

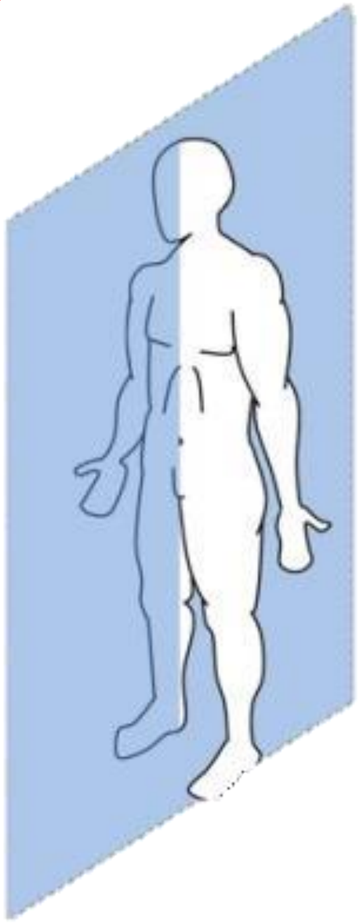
A vertical plane that runs parallel to the longitudinal axis of the body/organ and divides the body or an organ into right and left portions.

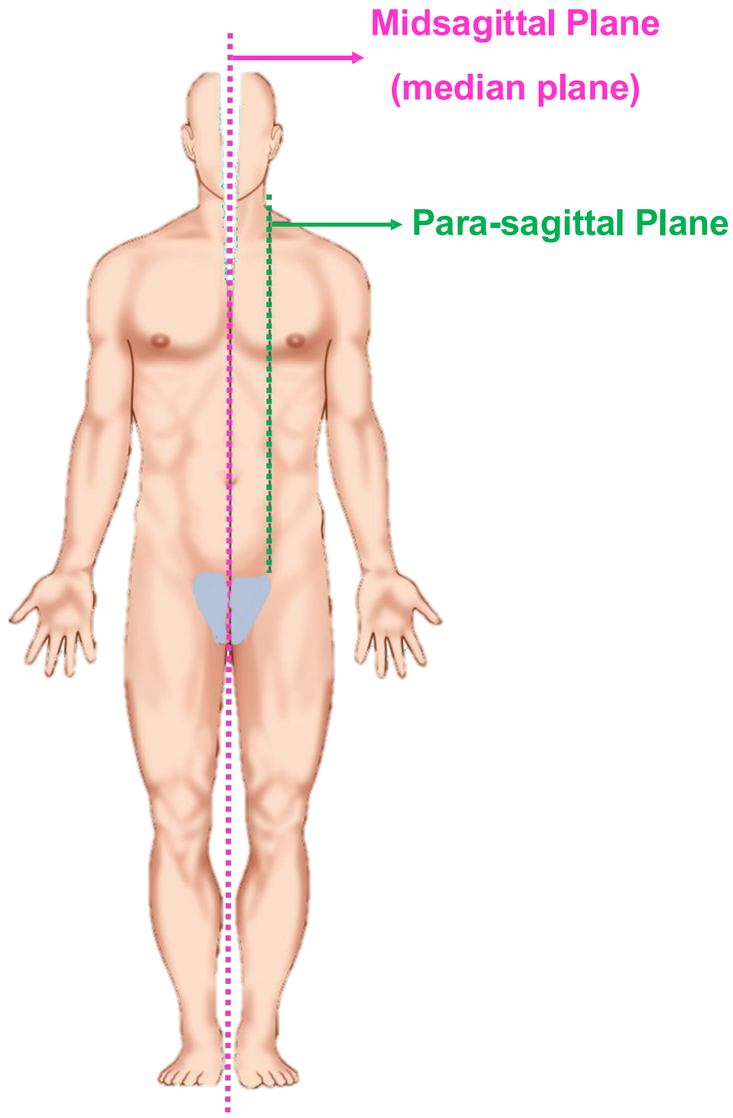
i. Midsagittal Plane (median plane):

A sagittal plane that passes through the midline of the body or an organ, dividing it into equal right and left halves.

ii. Para-sagittal Plane :

A sagittal plane that does not pass through the midline but divides the body or an organ into unequal right and left portions.

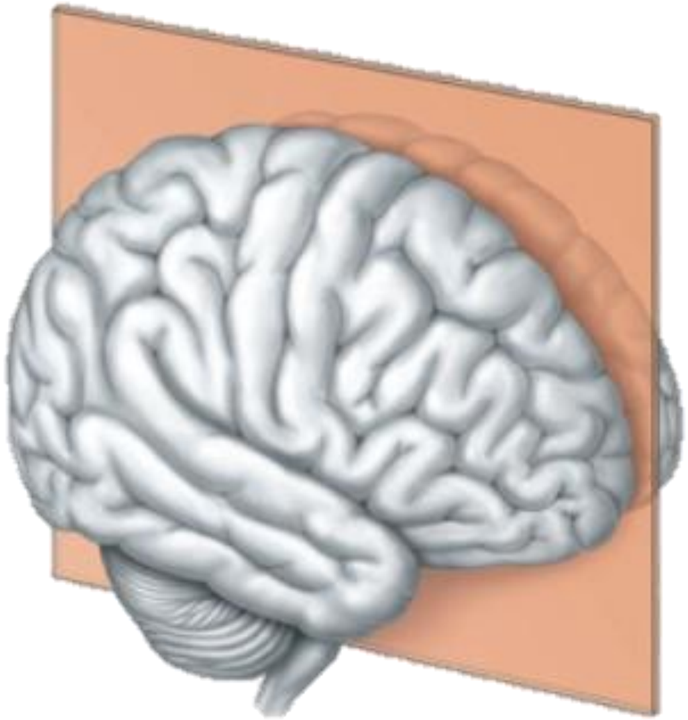




1.2 Anatomical Planes

1. **Sagittal Plane:**

   Midsagittal Plane (median plane)



Lateral view of the brain

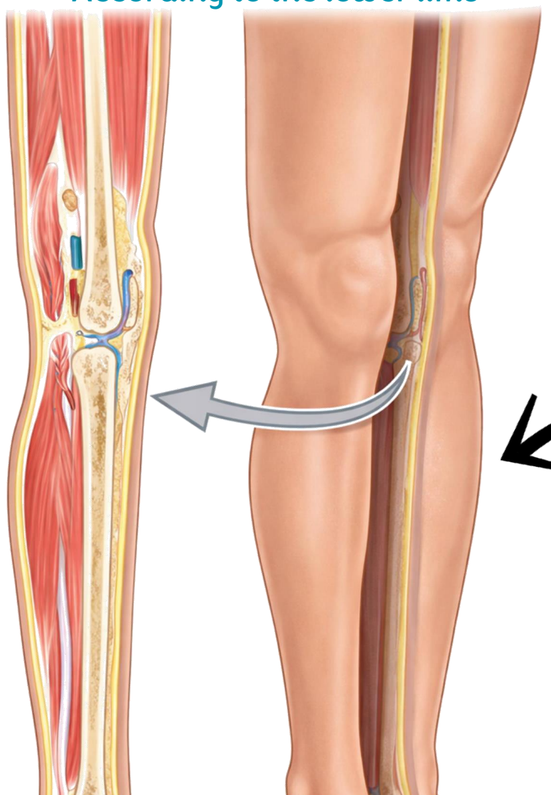
1.2 Anatomical Planes

Gross lecture-7

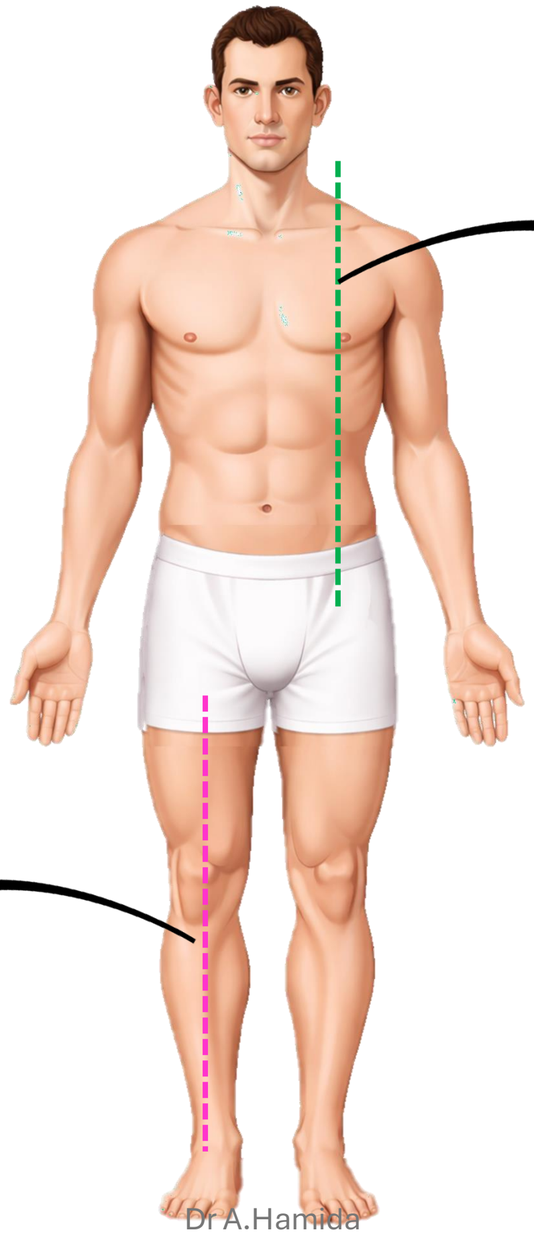
1. Sagittal Plane:

Midsagittal Plane

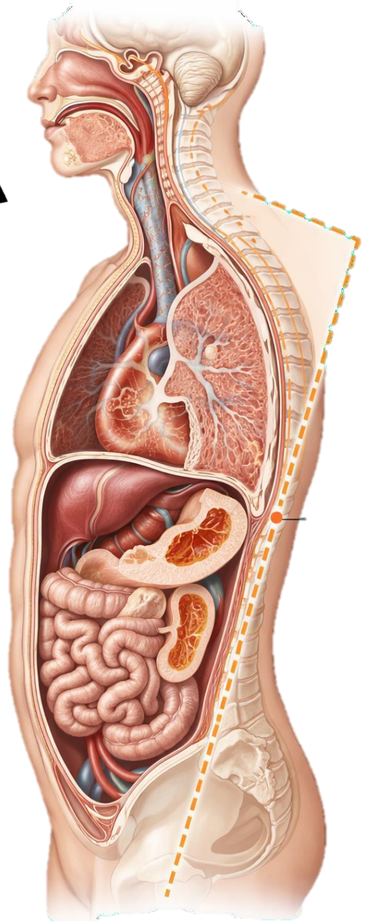
According to the lower limb



Considered para-sagittal plane according to the whole body



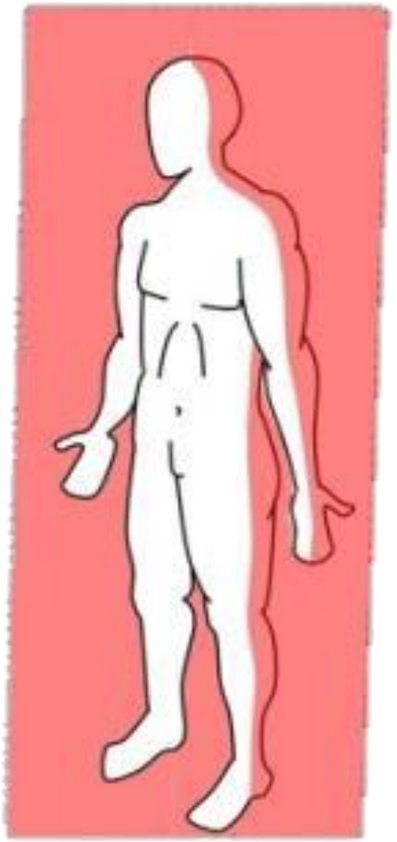
Para-sagittal Plane

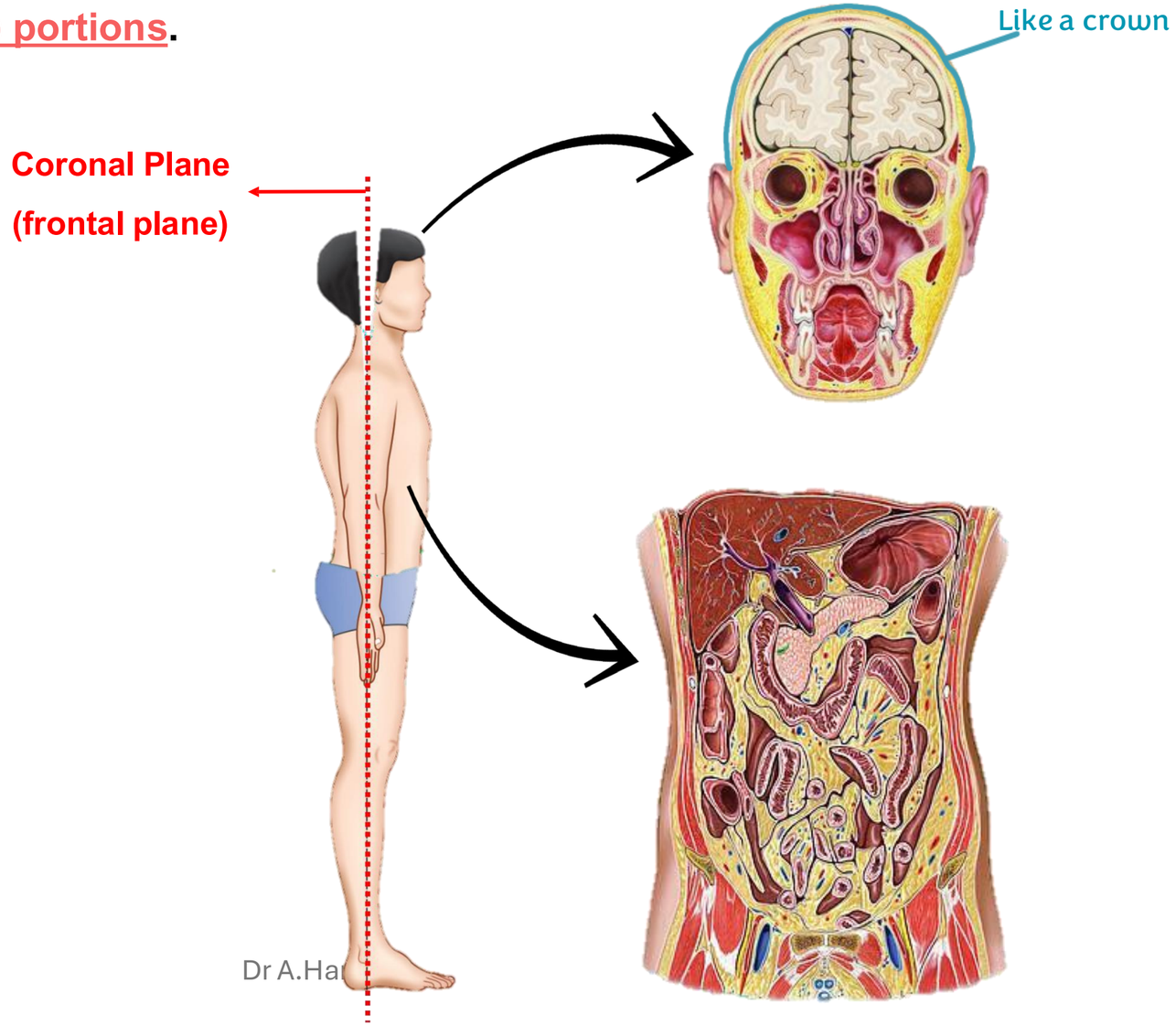


1.2 Anatomical Planes

2. Coronal Plane (Frontal Plane):

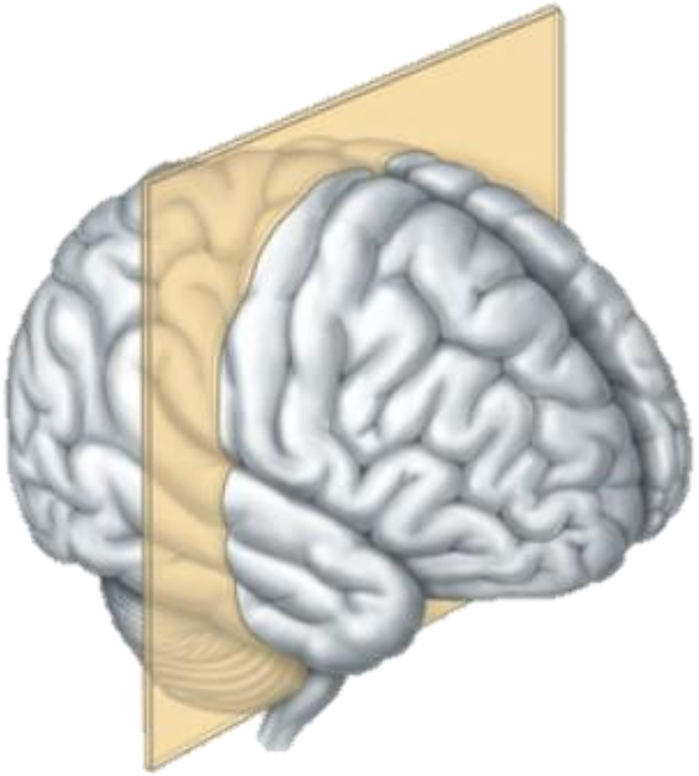
A vertical plane that runs at right angles to the sagittal plane and divides the body/organ into anterior (front) and posterior (back) portions.





1.2 Anatomical Planes

2. Coronal Plane (Frontal Plane):

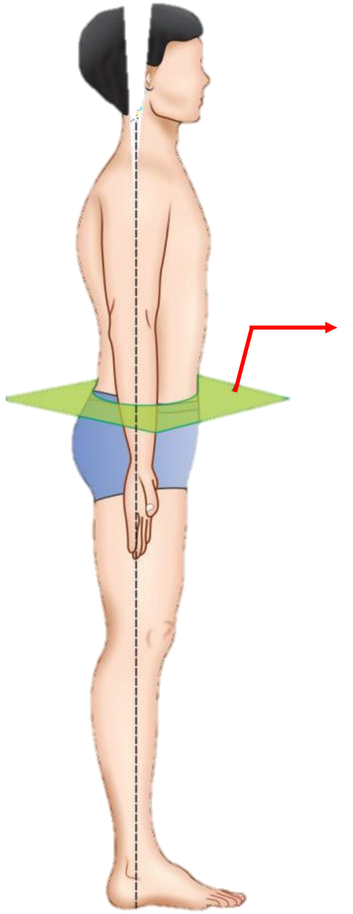


Anterior view of the brain

Gross lecture-1

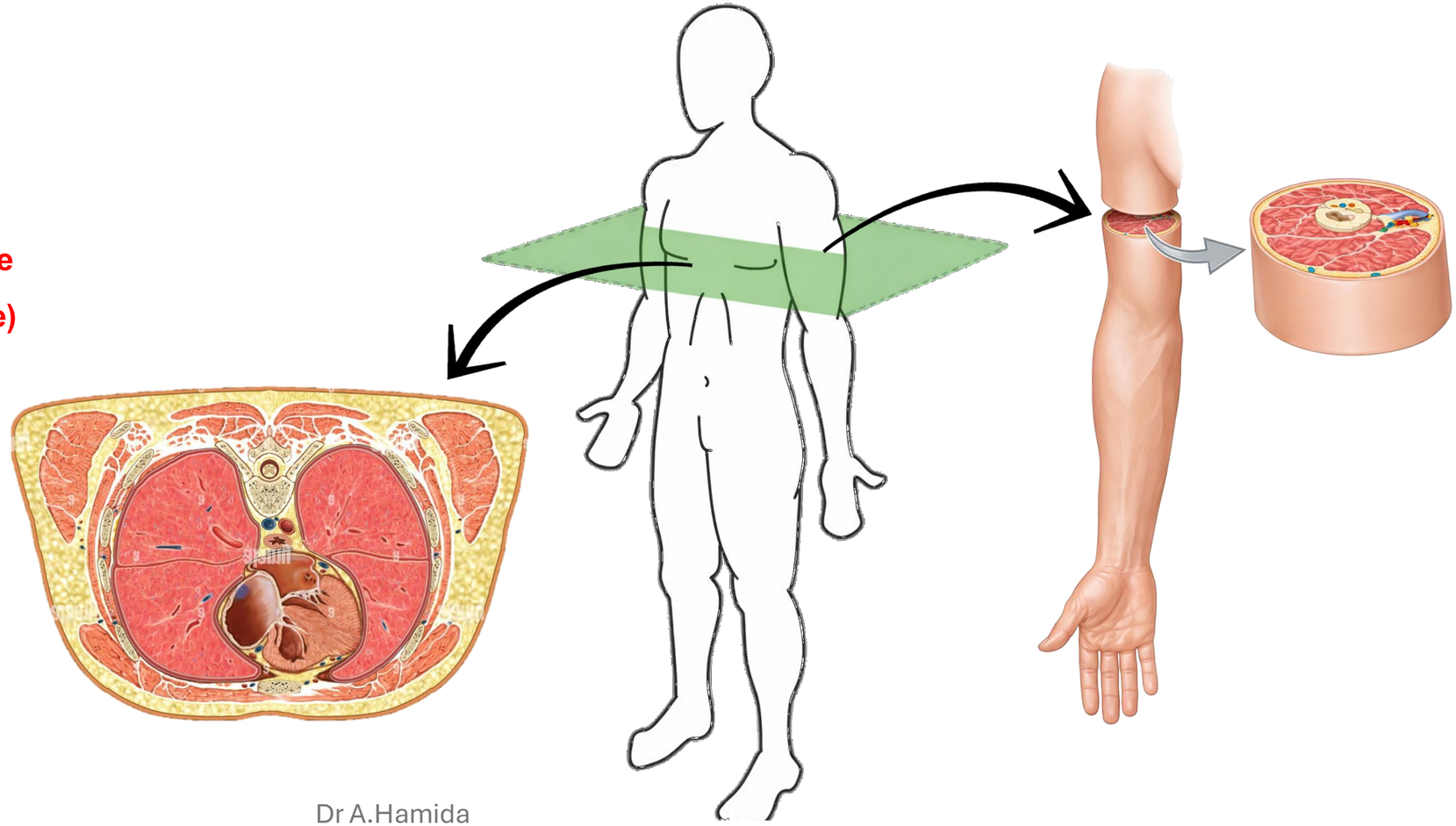
3. Transverse Plane (Horizontal Plane):

A horizontal plane that runs perpendicular to both the sagittal and coronal planes and divides the body/organ into superior (upper) and inferior (lower) portions.



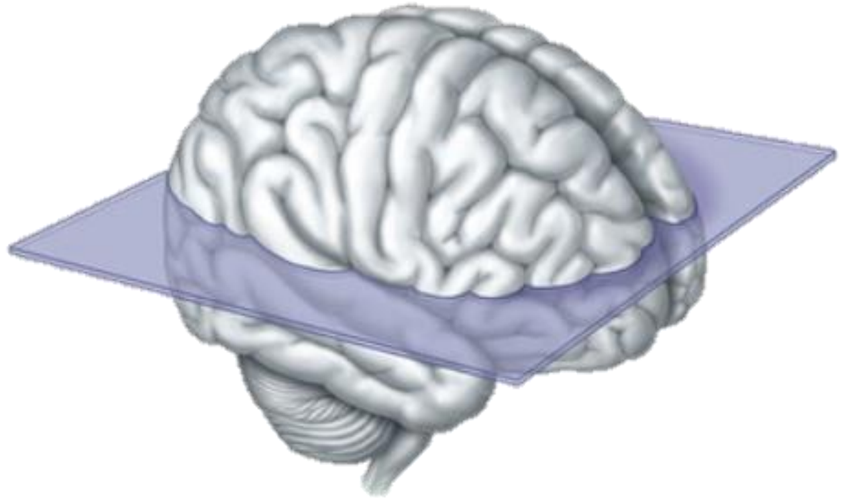
Transverse Plane

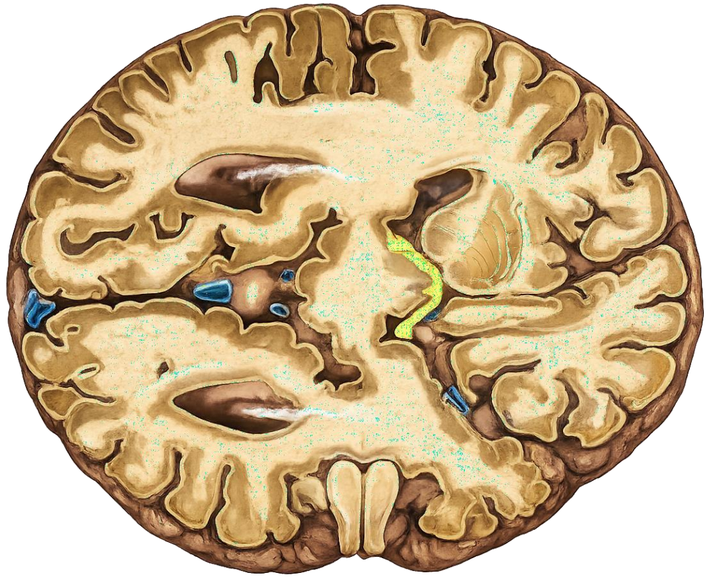
(horizontal plane)



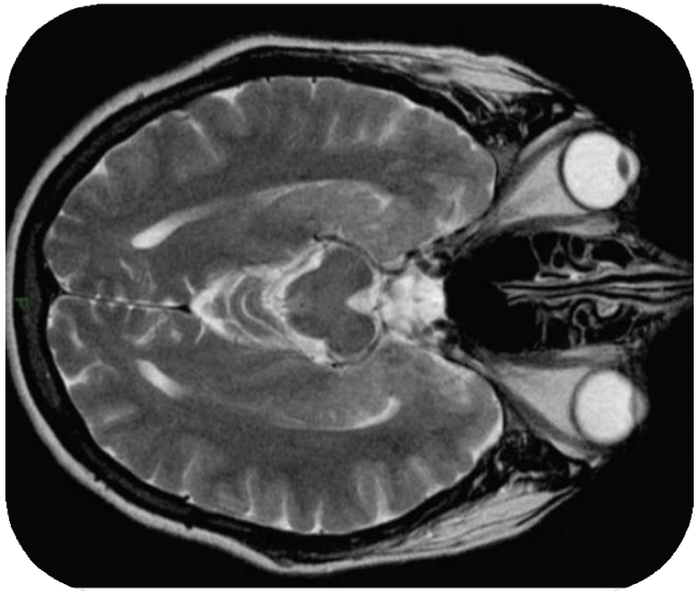
1.2 Anatomical Planes

3. Transverse Plane (Horizontal Plane):



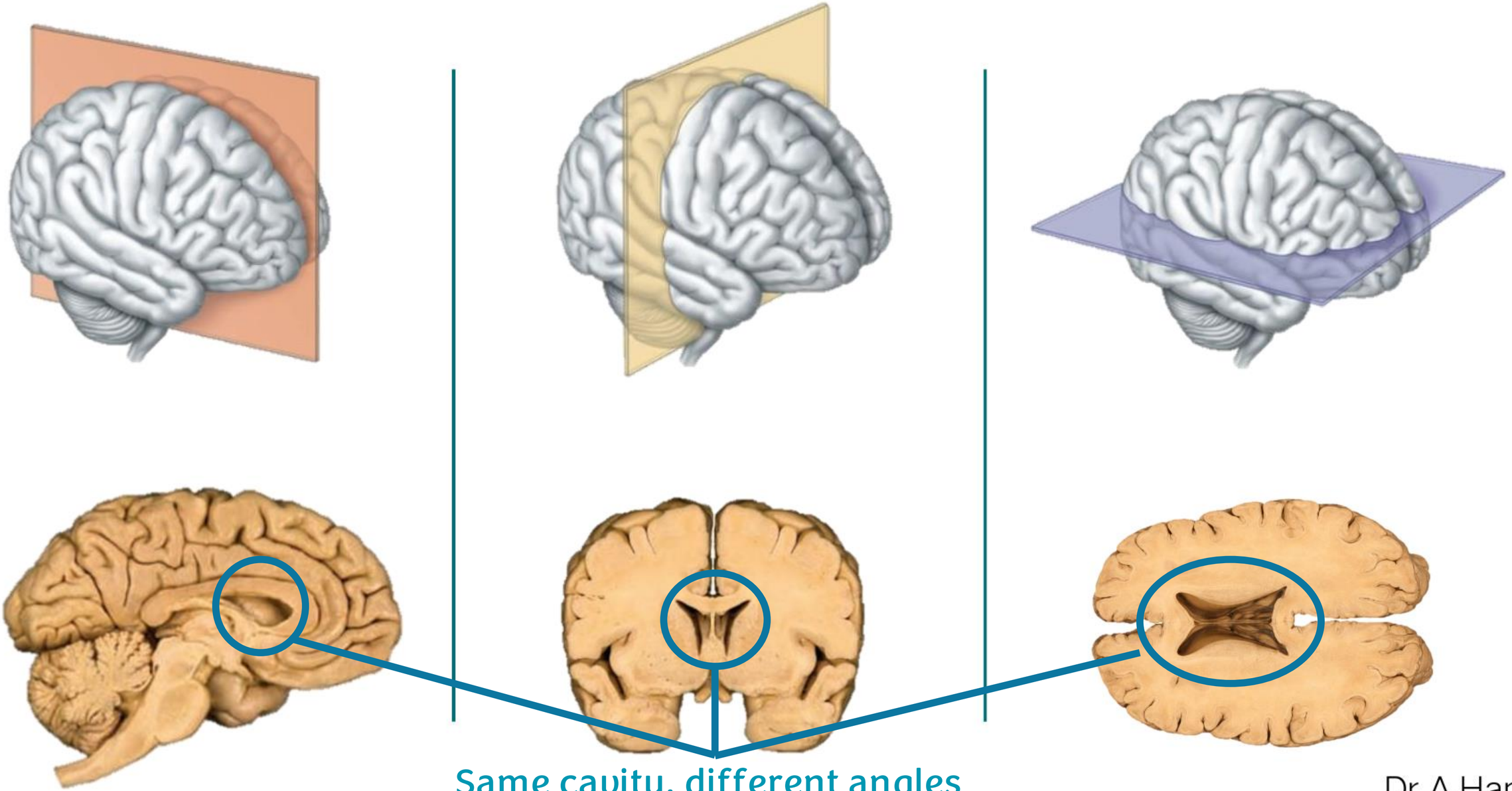


Superior view of the brain



1.2 Anatomical Planes

Gross lecture-1



Same cavity, different angles

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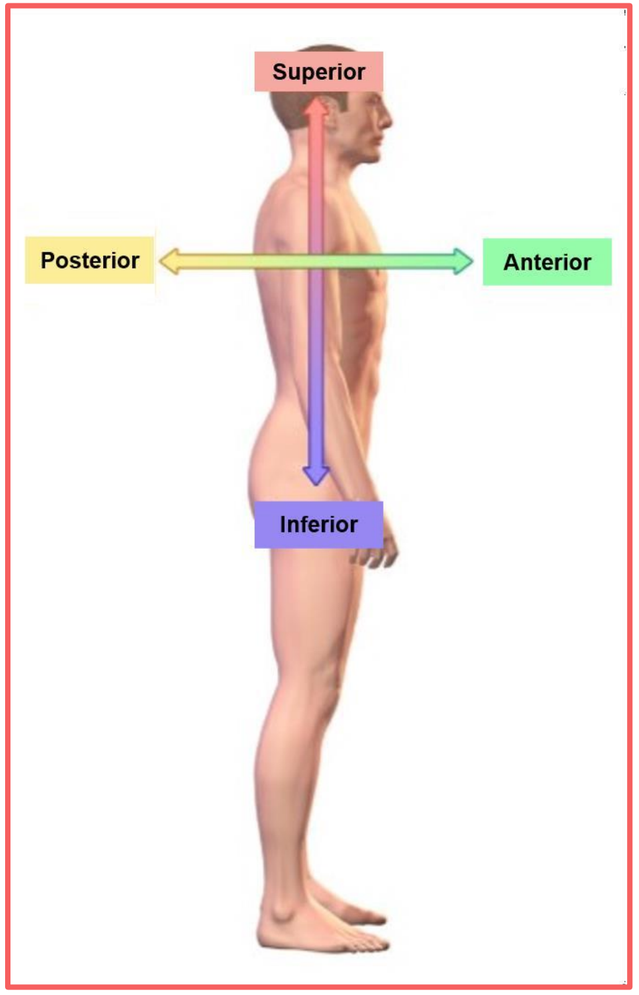
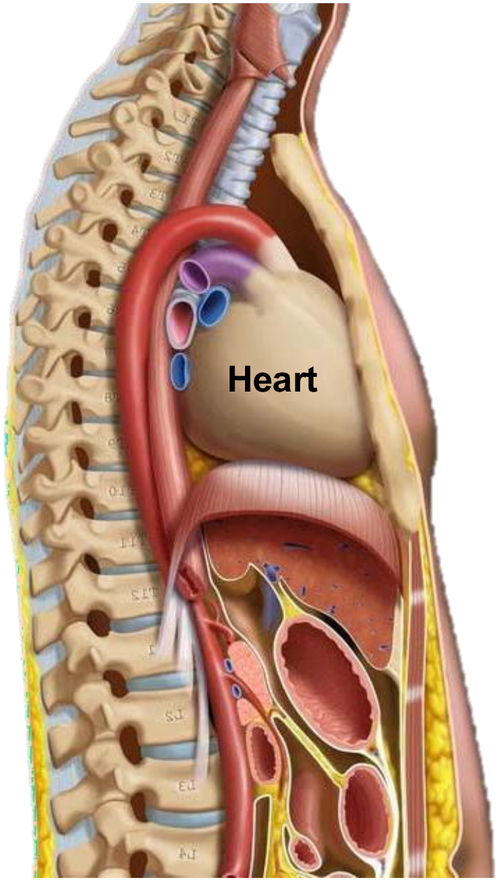
1.3 Directional Terms

➢ Terms used to describe the relationship between body parts and structures relative to each other:

Terms	Definition
Anterior (ventral)	Describes the front or direction toward the front of the body.
Posterior (dorsal)	Describes the back or direction toward the back of the body.

- These terms are used to locate one body part relative to another one. (the body must be in anatomical position).
- The **heart** here is posterior to the chest's skin, and anterior to the vertebral column at the same time





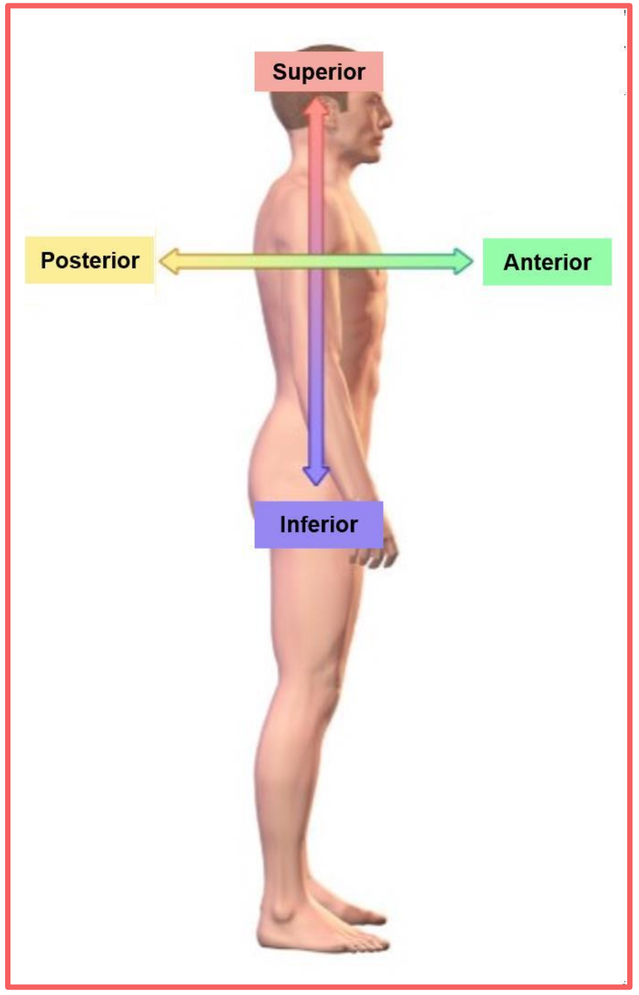
1.3 Directional Terms

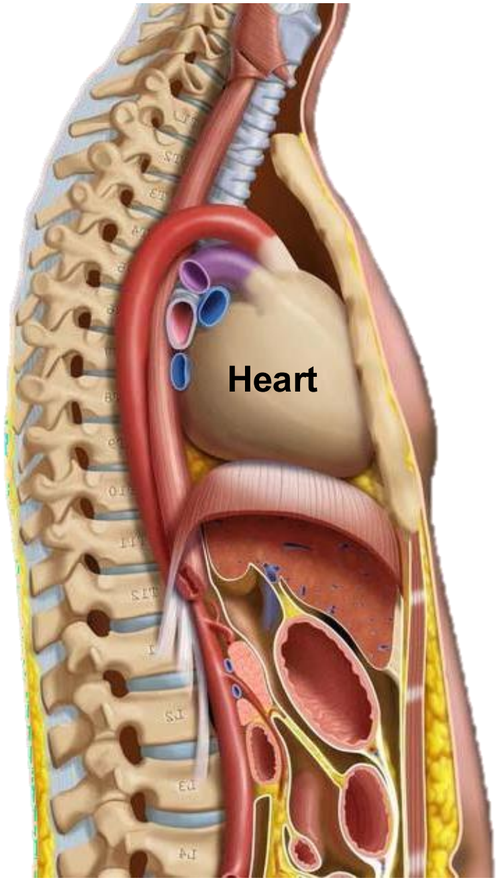
Gross lecture -1

➢ **Terms used to describe the relationship between body parts and structures relative to each other:**

Terms	Definition
Superior (cranial)	**Describes a position above or higher than another part.**
Inferior (caudal)	**Describes a position below or lower than another part.**

- The heart is superior from the diaphragm, and inferior from the head at the same time





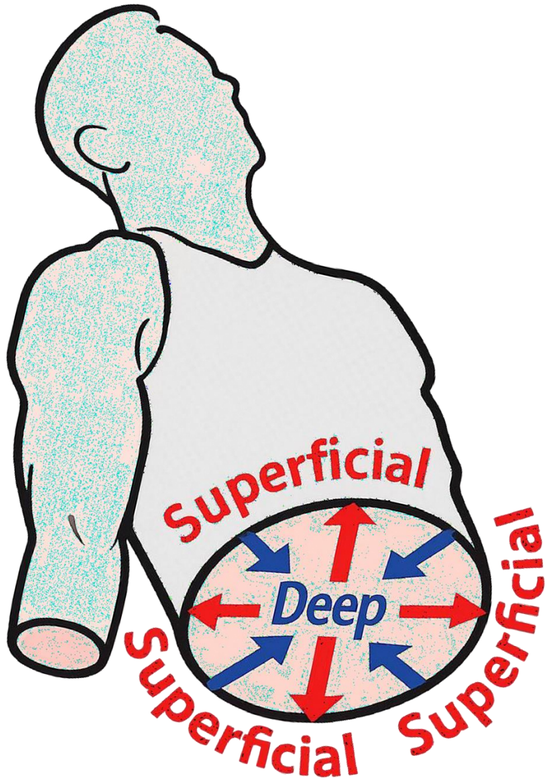
1.3 Directional Terms

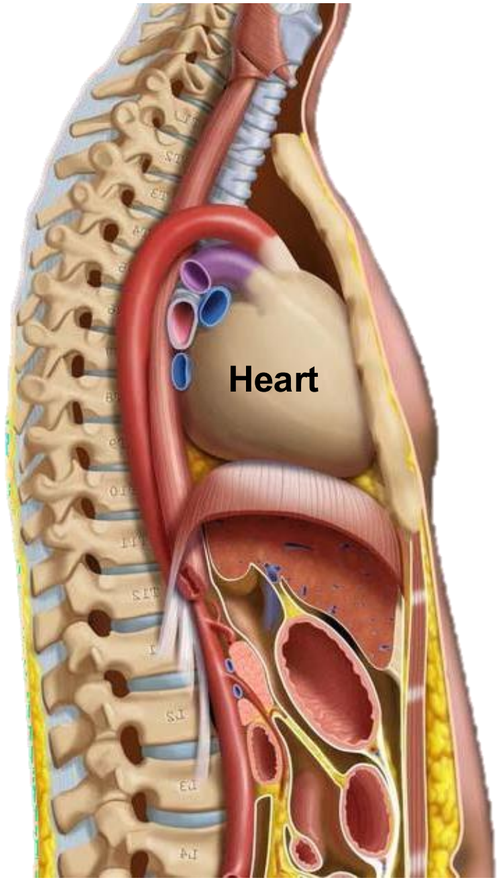
Gross lecture

➢ Terms used to describe the relationship between body parts and structures relative to each other:

Terms	Definition
Superficial	Describes a position closer to the surface of the body.
Deep	Describes a position farther from the surface of the body.

- The muscles are considered deep from the skin, and the skin is superficial from the muscles

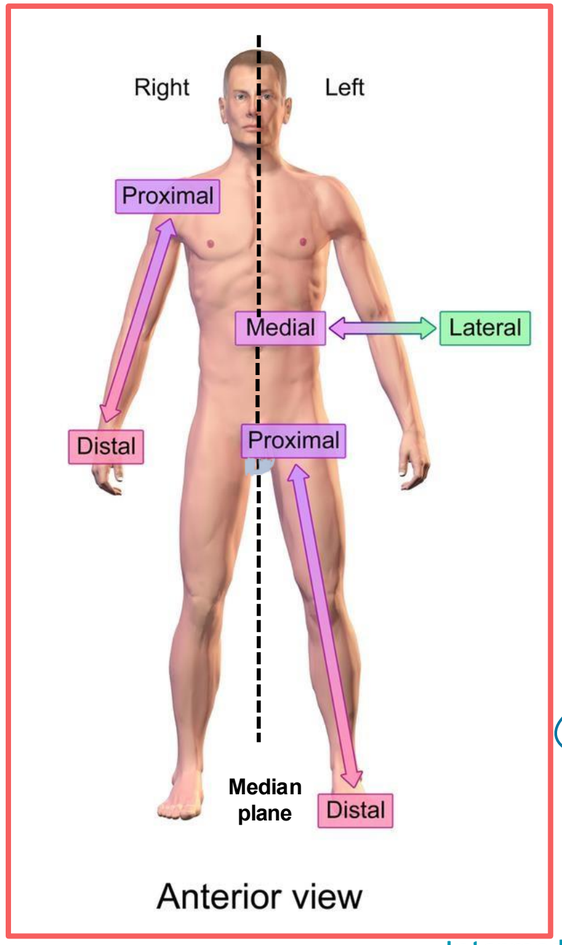


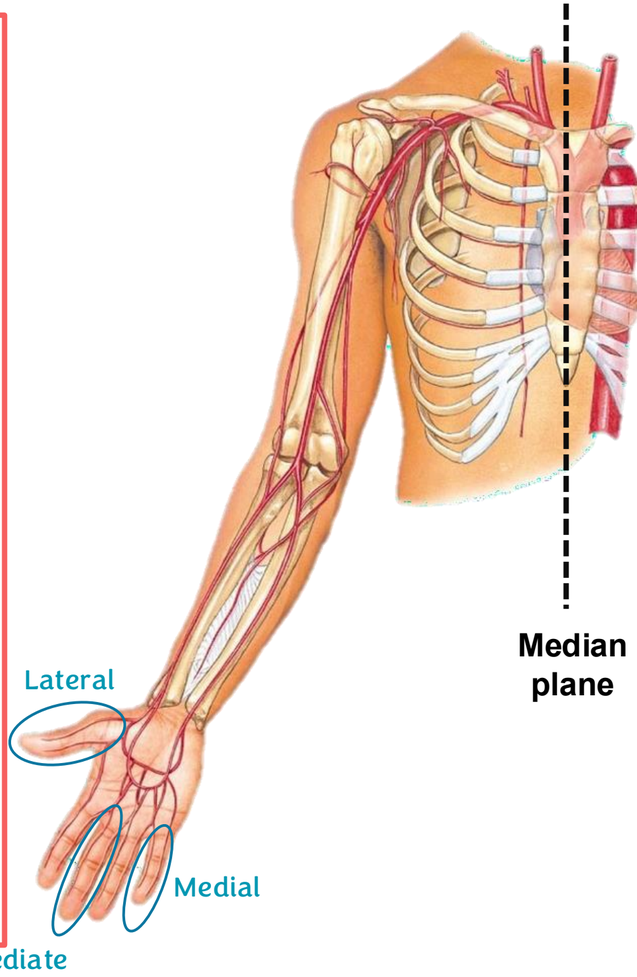


1.3 Directional Terms

➢ Terms used to describe the relationship between body parts and structures relative to each other:

Terms	Definition
Median	Describes a position situated in the midline of the body, along the midsagittal (median) plane
Medial	Describes the side or direction toward the inner side of the body (toward the midline).
Lateral	Describes the side or direction toward the outer side of the body (away from the midline).
Intermediate	Describes a position between medial and lateral





1.3 Directional Terms

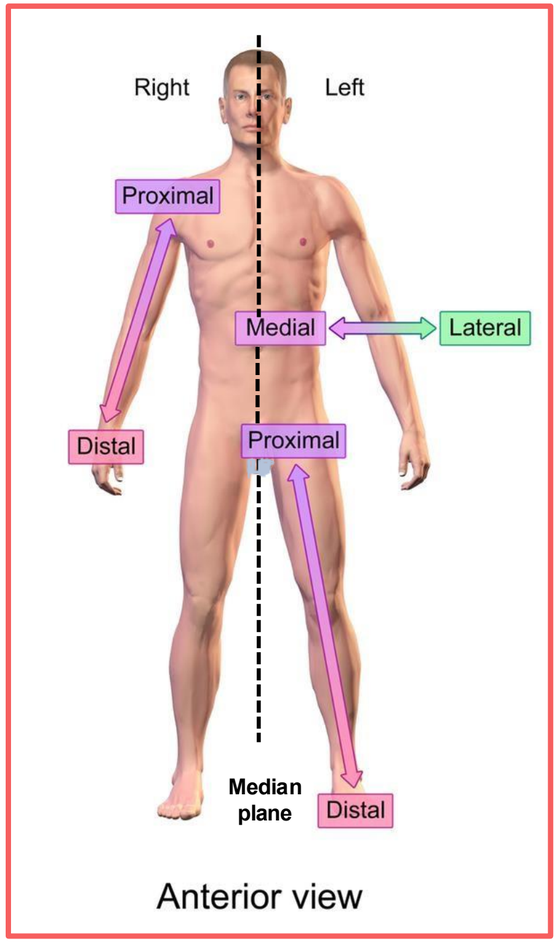
Gross lecture -1

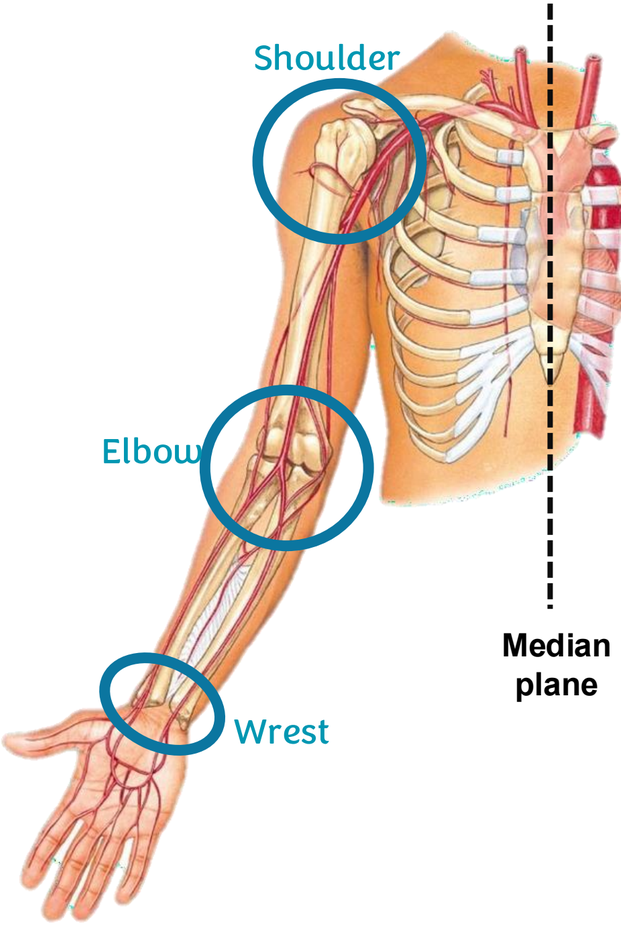
➢ Terms used to describe the relationship between body parts and structures relative to each other:

(Proximal/distal) terms are used in limbs

Terms	Definition
Proximal	Describes a position in a limb that is closer to the point of attachment or to the trunk of the body.
Distal	Describes a position in a limb that is farther from the point of attachment or from the trunk of the body.

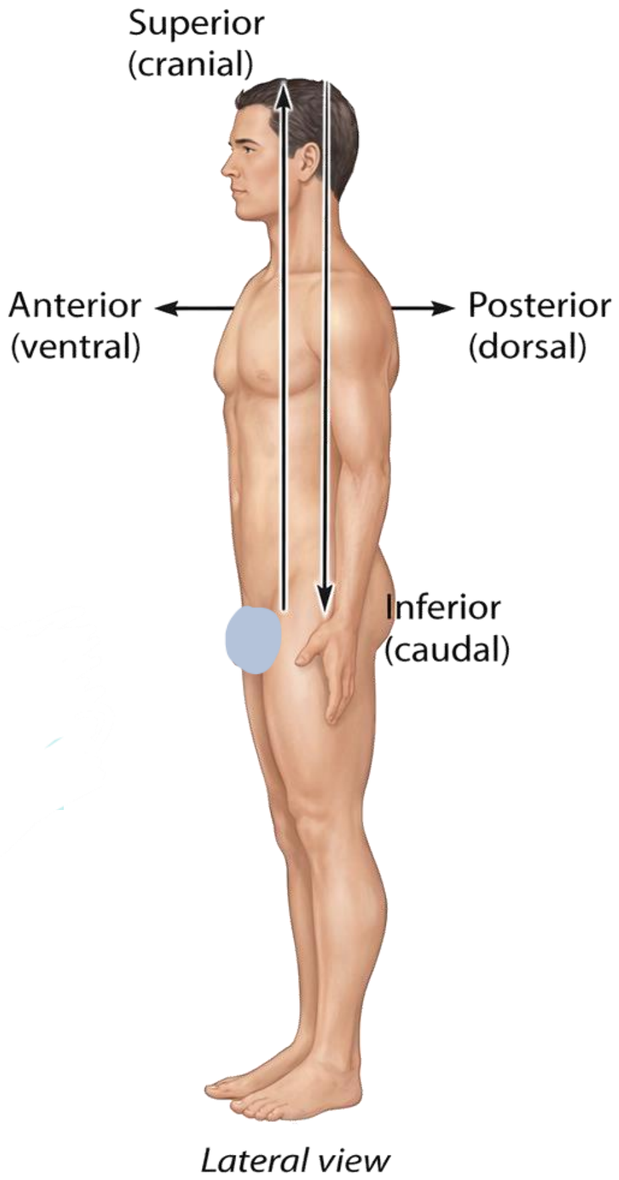
- The elbow is distal from the shoulder , and proximal to the wrest



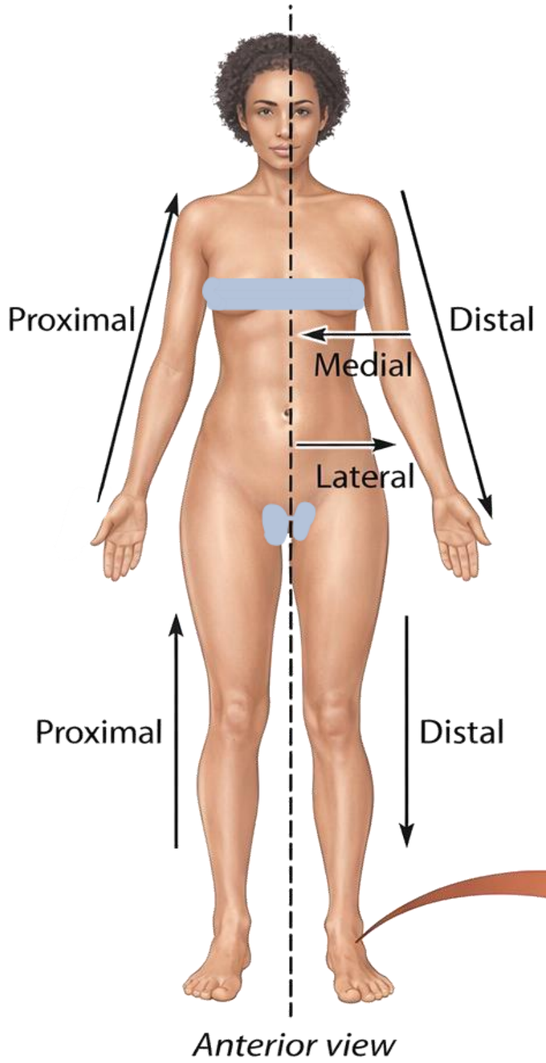


1.3 Directional Terms

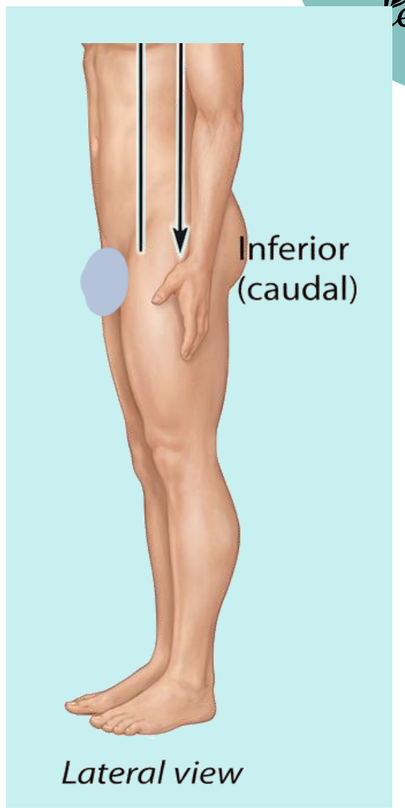
Gross Lecture-1



Lateral view



Anterior view



Lateral view

Medial view

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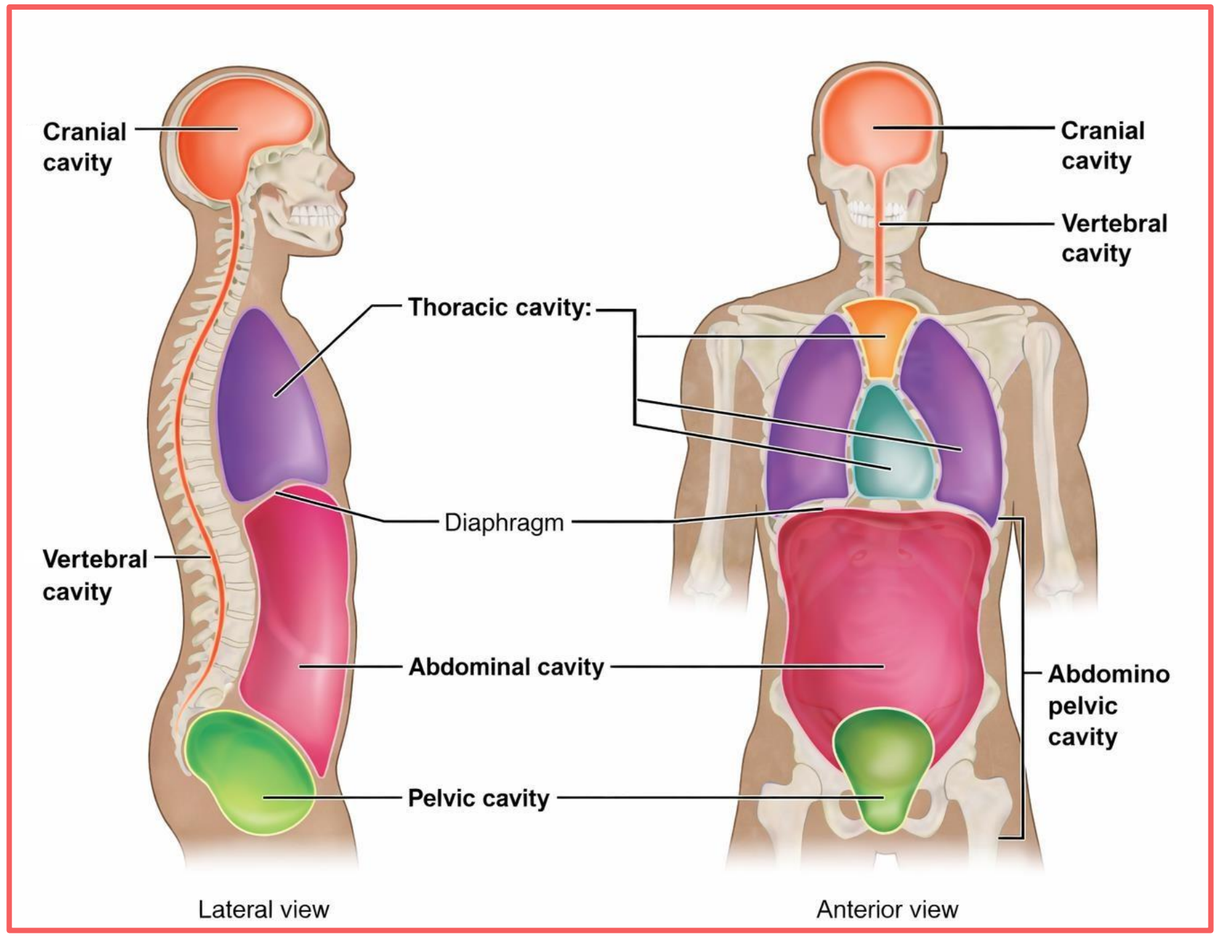
1.4 Body Cavities

Gross lecture-1

- Body cavities are spaces filled with organs, nerves, vessels and muscles.

- Major body cavities:

1. Cranial Cavity.
2. Spinal Cavity (Vertebral Cavity).
3. Thoracic Cavity.
4. Abdominal Cavity.] Abdominopelvic Cavity
5. Pelvic Cavity.]



Cavities are spaces made by bones and muscles in the body. Each cavity has a membrane that consists of at least two layers, some of them has three, we will discuss them in the following slides.

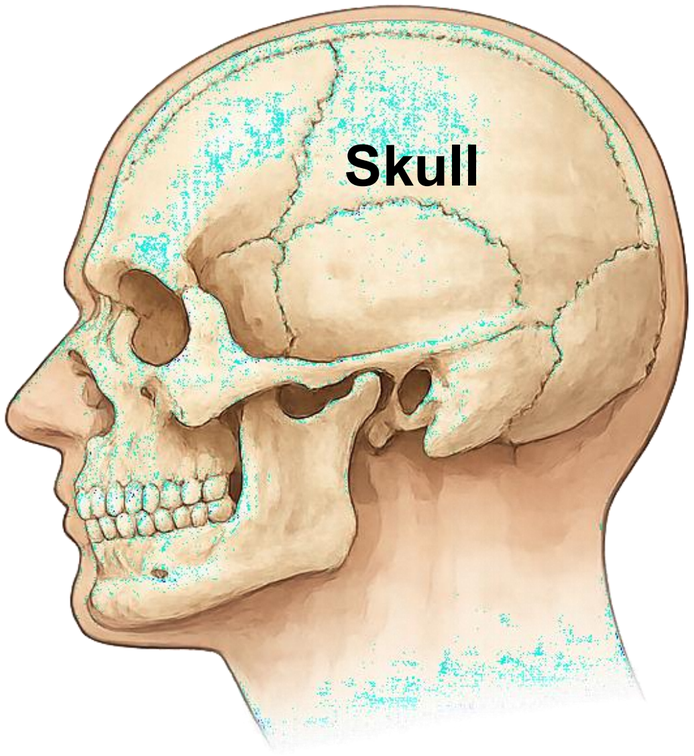
We will also come through other types cavities, like the nasal cavity and the oral cavity, etc.., but they are not major as the list above.

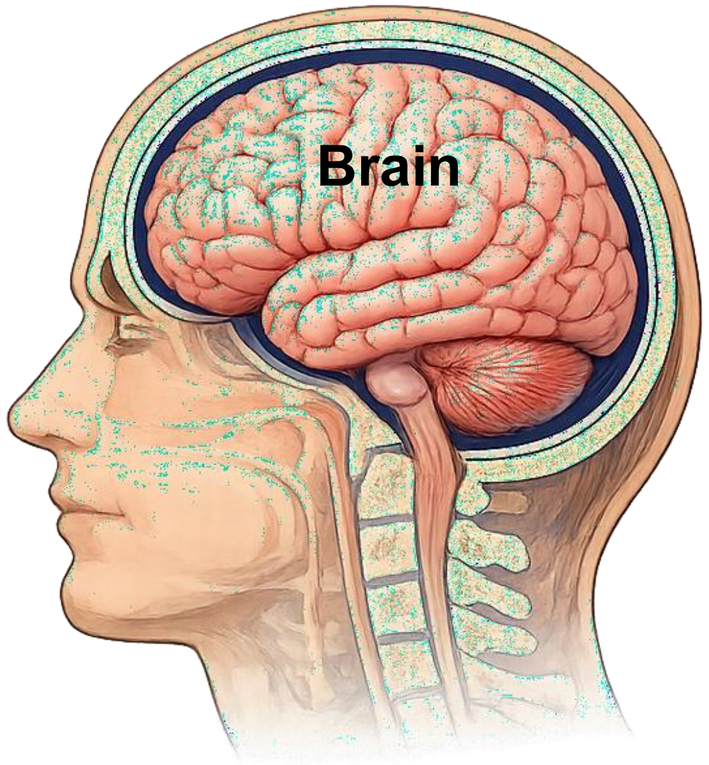
1.4 Body Cavities

Gross lecture-1

➢ Major body cavities:

1. **Cranial Cavity:**
   - **Formed by:** the cranial bones of the skull
   - **Contains:** the brain





1.4

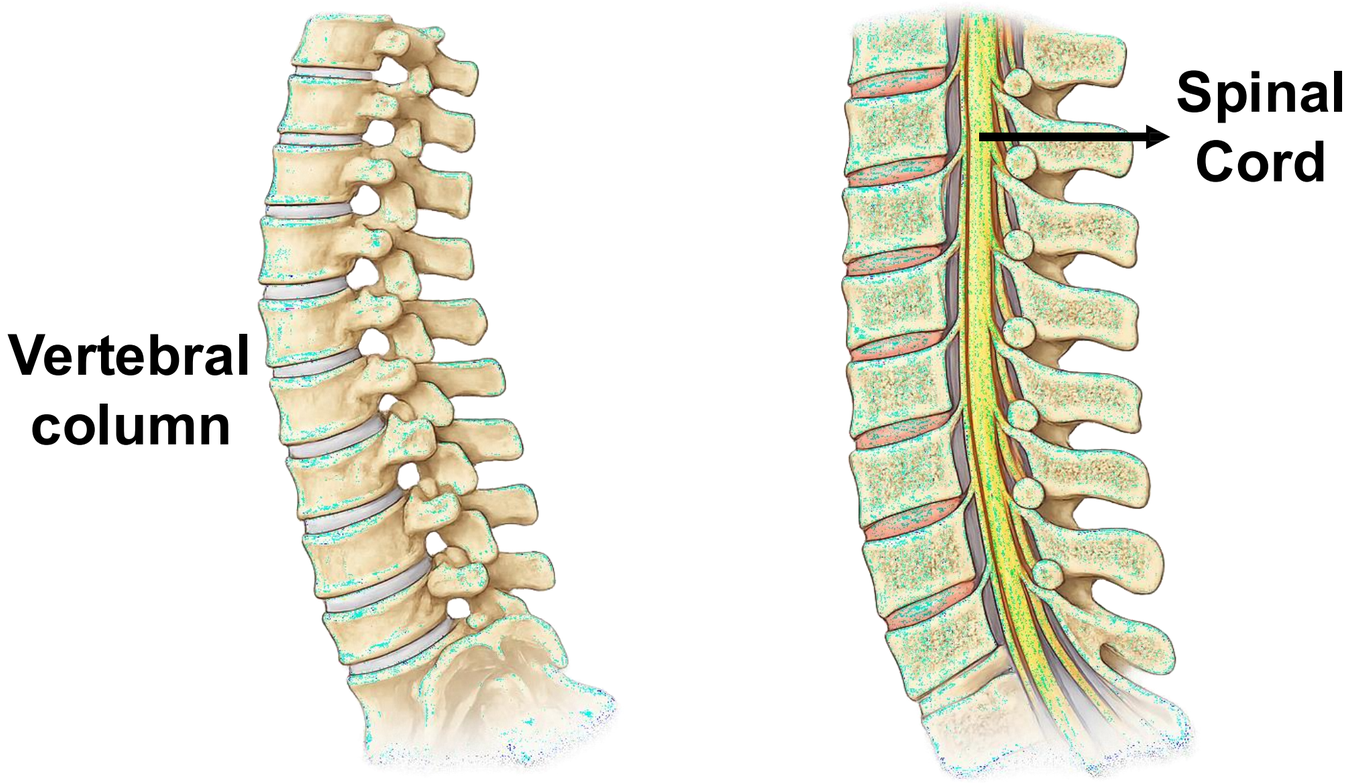
Body Cavities

This cavity is the continuation of the cranial cavity

➢ **Major body cavities:**

2. **Spinal Cavity (Vertebral Cavity):**

   - **Formed by:** the vertebral column (vertebrae)
   - **Contains:** the spinal cord



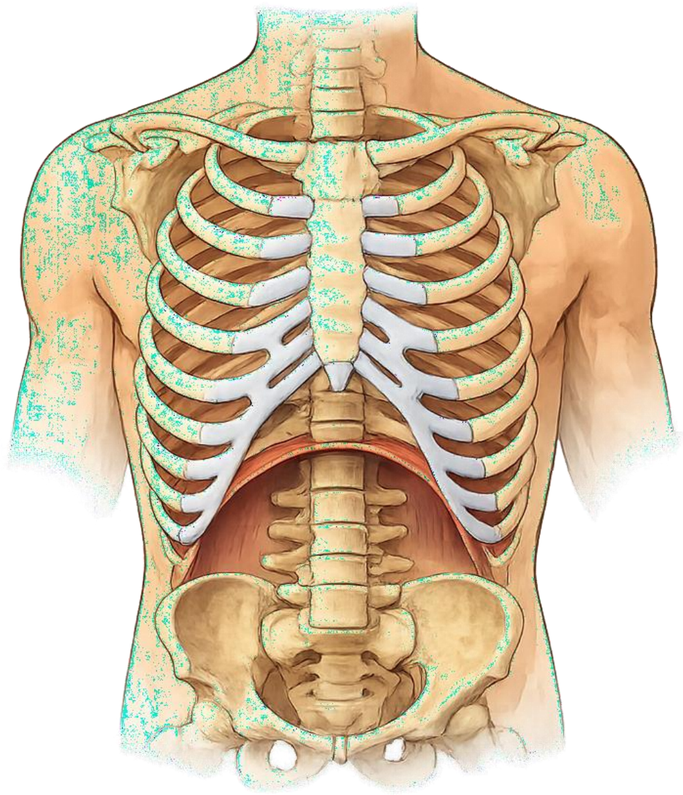
1.4 Body Cavities

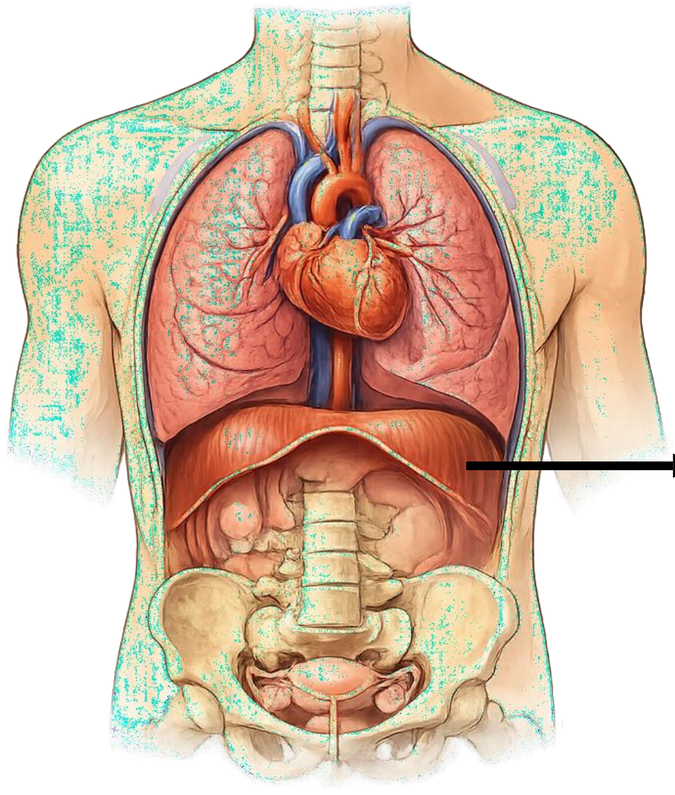
Gross lecture-7

➢ **Major body cavities:**

3. **Thoracic Cavity:**

- **Formed by:** the ribs, sternum, thoracic vertebrae, and associated thoracic muscles
- **Contains:** the heart and lungs





Diaphragm

is a dome-shaped muscle that separates the thoracic cavity from the abdominopelvic cavity

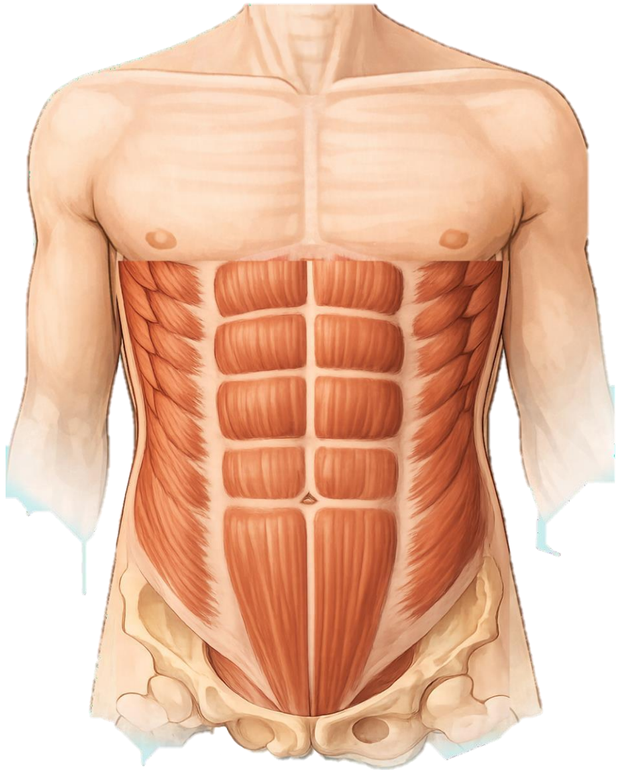
1.4 Body Cavities

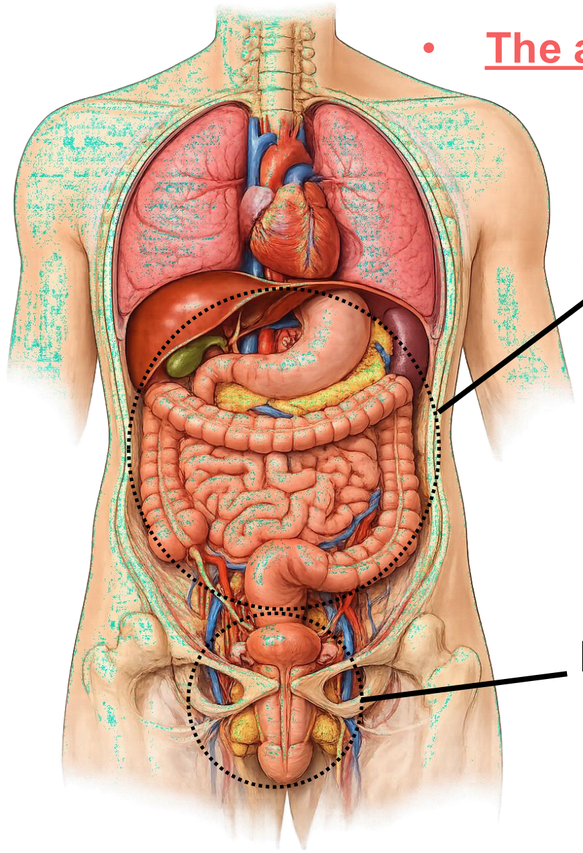
Gross lecture-7

➢ **Major body cavities:**

4. **Abdominopelvic Cavity:** (Abdominal cavity + pelvic cavity)

   - **Formed by:** the abdominal muscular walls and the bones and muscles of the pelvis





- **The abdominopelvic cavity is divided into two regions:**

a. **Abdominal Cavity (Superior Portion):**

Contains: the stomach, liver, gallbladder, spleen, small intestine, and most of the large intestine.

b. **Pelvic Cavity (Inferior Portion):**

Contains: - the urinary bladder,
- portions of the large intestine (e.g., rectum),
- internal reproductive organs.

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1.5 Body Cavity Membranes

Gross lecture-1

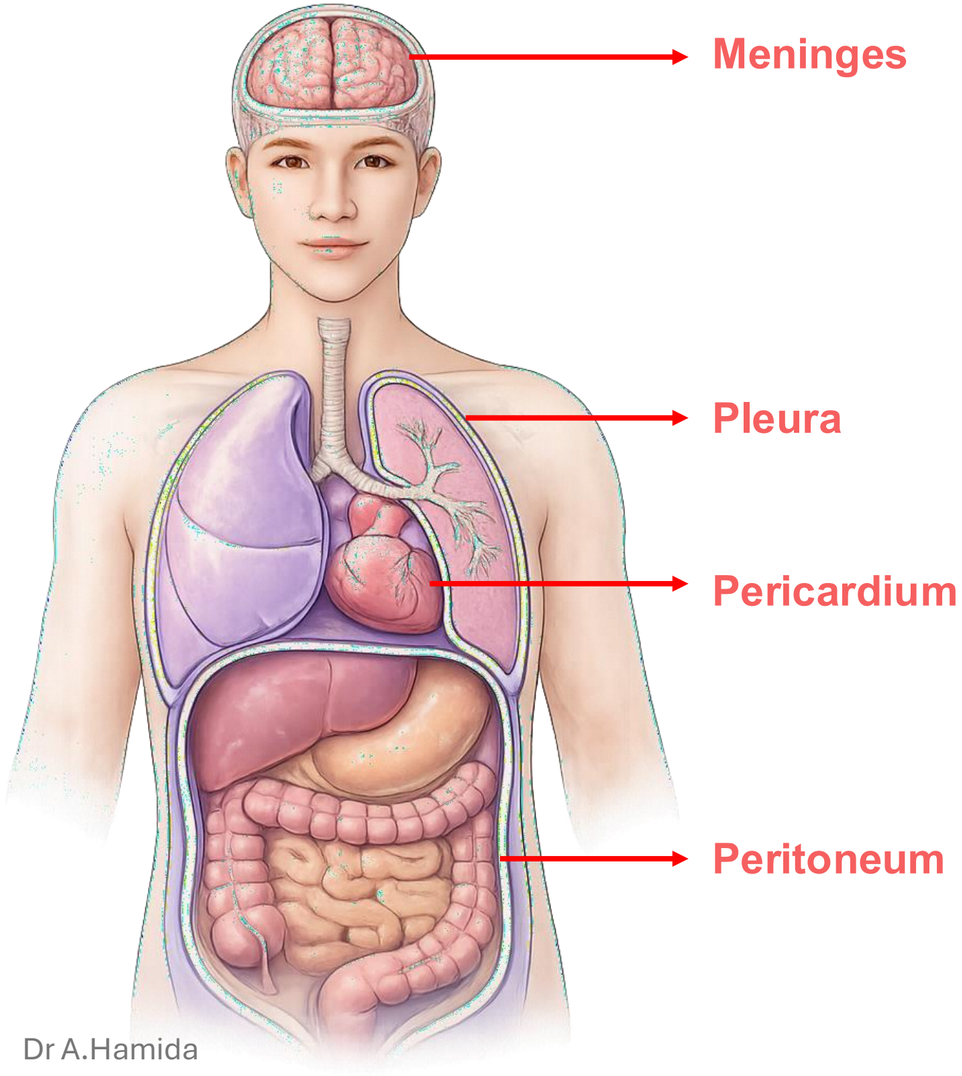
➢ Body membranes are thin protective tissue layers that cover organs and line body cavities.

➢ Major body cavity membranes:

1. Pleura
2. Pericardium
3. Peritoneum

Serous Membrane

4. Meninges



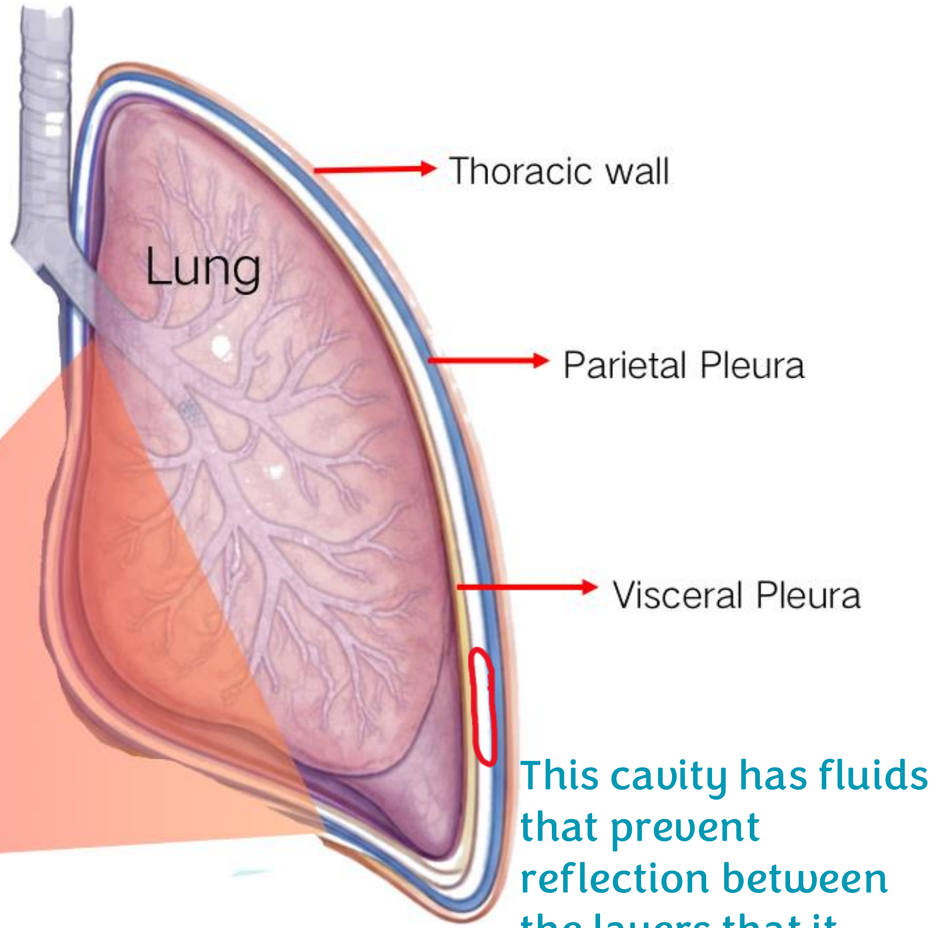
1.5 Body Cavity Membranes

Gross lecture-1

➢ **Major body cavity membranes:**

1. **Pleura:**
   - **Parietal Pleura:** lines the thoracic cavity
   - **Visceral Pleura:** covers the lungs

- Parietal : lines the cavity.
- Visceral: covers the organ.



This cavity has fluids that prevent reflection between the layers that it separates during breathing

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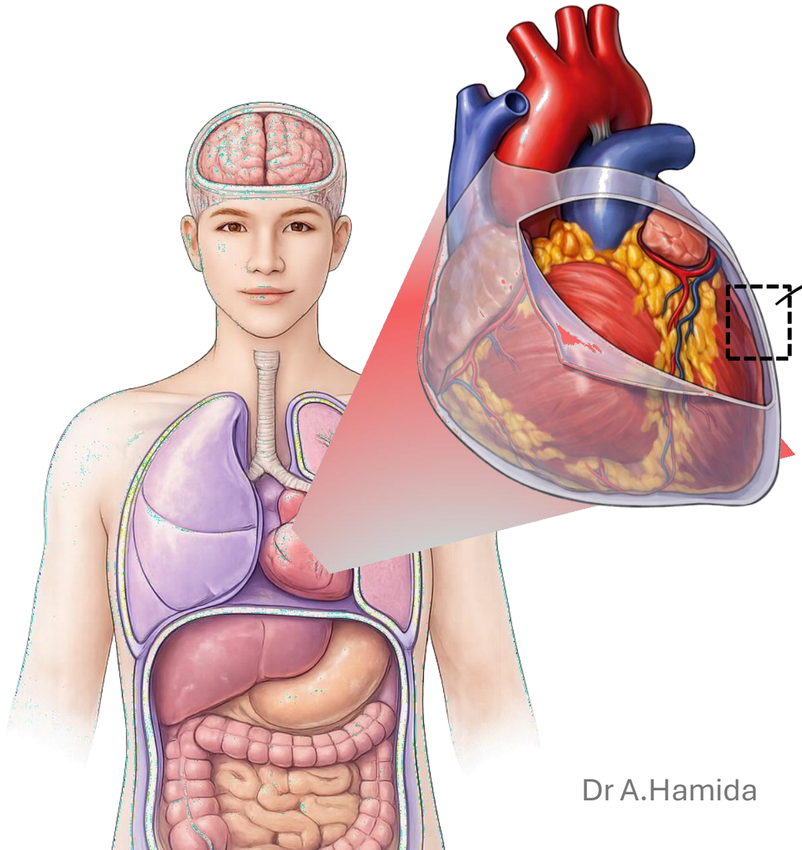
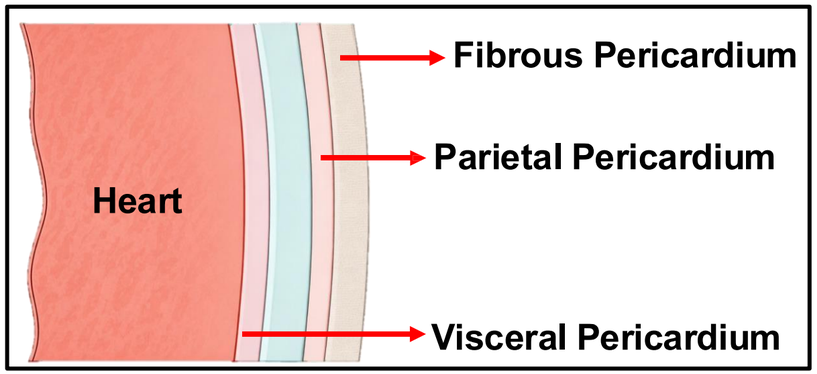
1.5 Body Cavity Membranes

Gross lecture-7

➢ **Major body cavity membranes:**

2. **Pericardium:**
   - **Fibrous Pericardium:** tough, inelastic, outermost connective tissue layer
   - **Serous Pericardium**
     - **Parietal Pericardium:** lines the Fibrous Pericardium
     - **Visceral Pericardium:** covers the heart





The cavity illustrated in blue is pericardium cavity, it contains a neglected amount of fluids to prevent friction between the layers that it separates them for smooth heart movement, you will se similar cavities like it in other organs, like the one in white in the previous slide

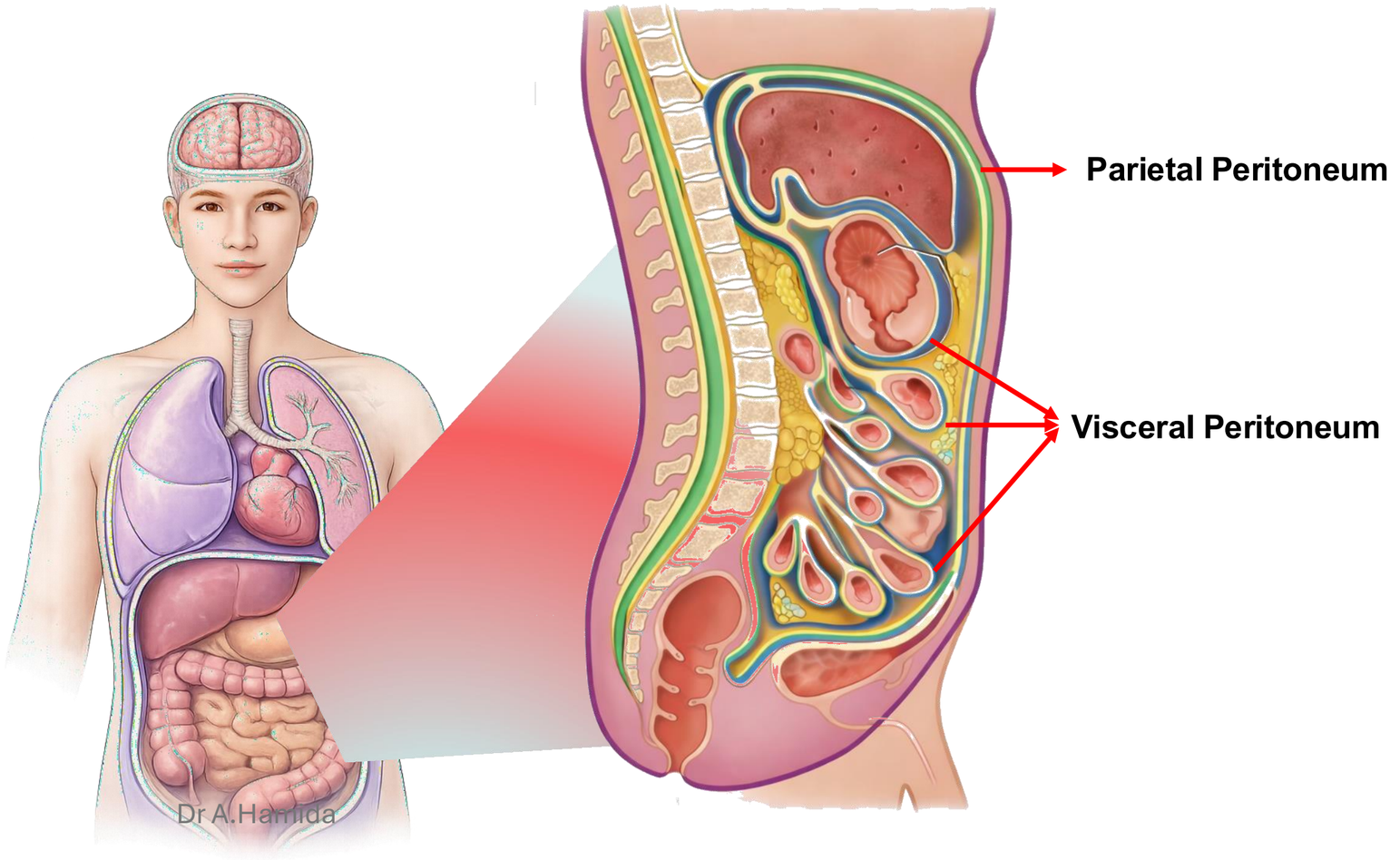
1.5 Body Cavity Membranes

Gross lecture-7

➢ **Major body cavity membranes:**

3. **Peritoneum:**
   - **Parietal Peritoneum:** lines the abdominopelvic cavity
   - **Visceral Peritoneum:** covers the abdominal organs

- Parietal : lines the cavity.
- Visceral: covers the organ.



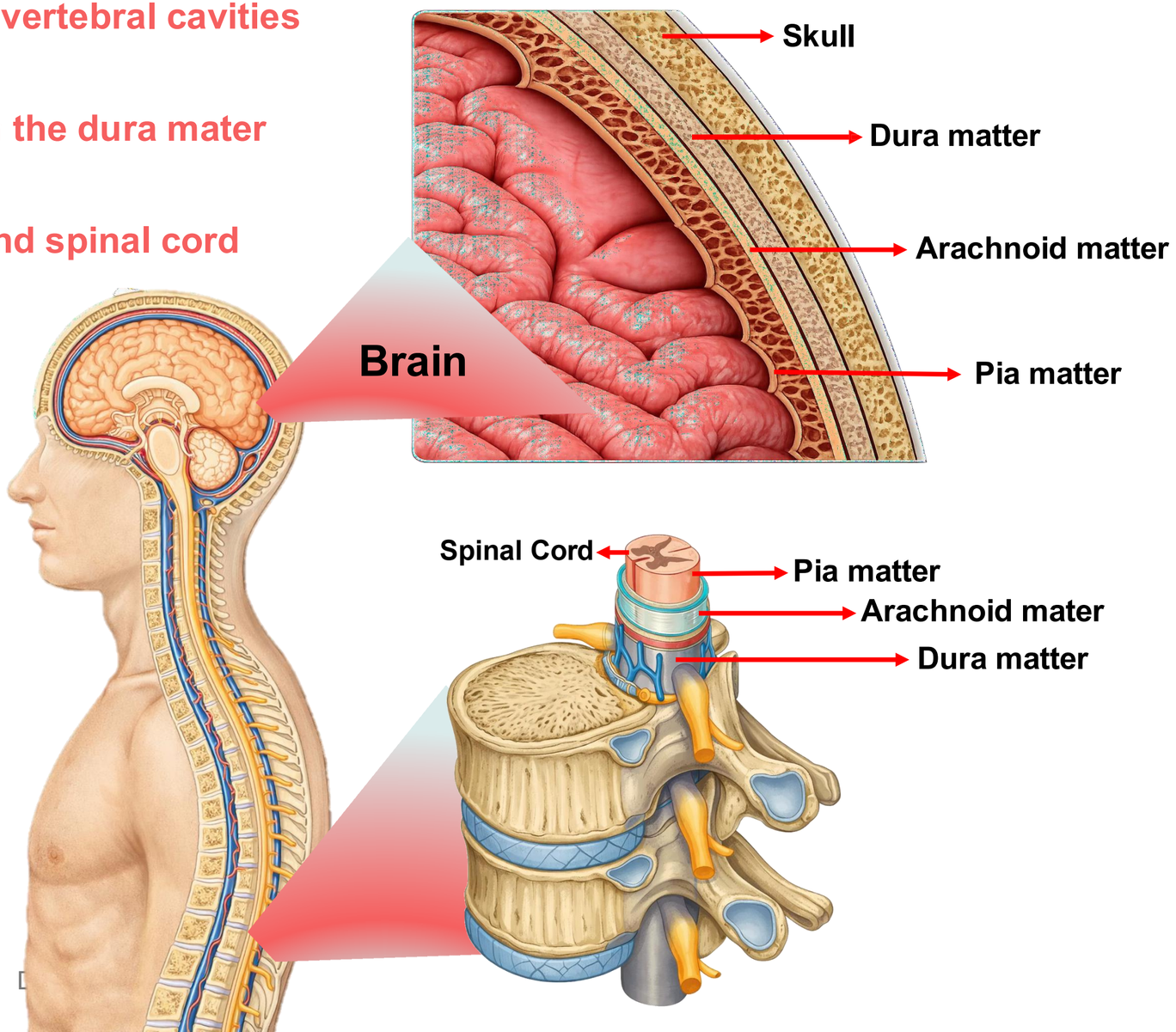
Here is a piece of information for you but it's not important for now : There is a similar fluid that decreases the friction in a cavity, just like the cavities in the organs before, these three fluids are called together, serous fluids which also explains why we call the three cavities's membranes (serous

1.5 Body Cavity Membranes

Gross lecture-7

➢ Major body cavity membranes:

4. **Meninges**:
   - **Dura matter**: lines cranial and vertebral cavities
   - **Arachnoid mater**: lies beneath the dura mater
   - **Pia matter**: covers the brain and spinal cord



For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1			
V1 → V2			

Additional Resources:

رسالة من الفريق العلمي: