Shatt Al-Arab University
College of Science
Department of Pathological analyses science
1st Stage
General Anatomy

Introduction of Anatomy

Anatomy – the study of the ***structure*** and ***shape*** of the body and body parts & their ***relationships*** to one another. The term anatomy comes from the Greek words meaning to Apart (ana) and cut (tomy).

- **Gross anatomy(macroscopic anatomy)** – the study of large, easily observable structures (by naked eye), such as the heart or bone.

- **Microscopic anatomy** (cytology, histology) – the study of very small structures, where a magnifying lens or microscope is needed.

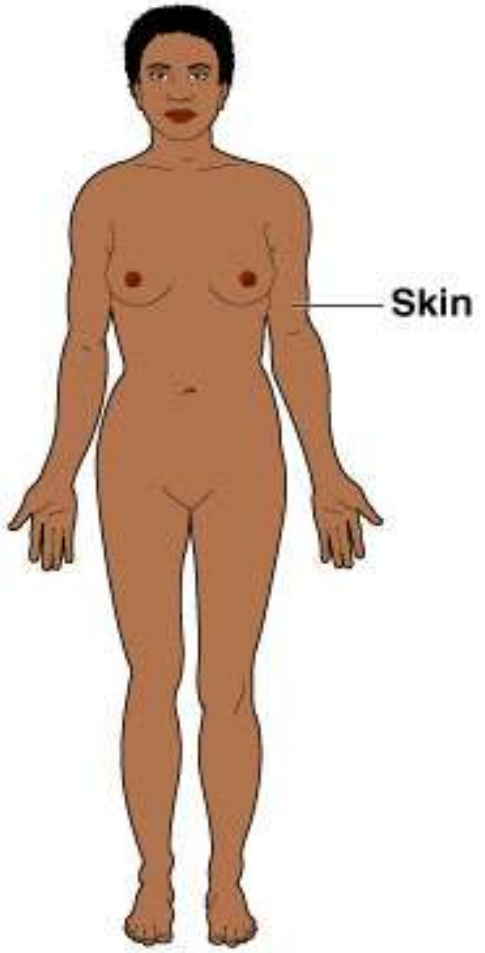
Body Systems:
1-INTEGUMENTARY

ORGANS

- **Skin**

FUNCTIONS

- **Waterproofs, cushions, protects deeper tissue**
- **Excretes salts & urea; pain, pressure**
- **Regulates body temp; synthesize vitamin D**

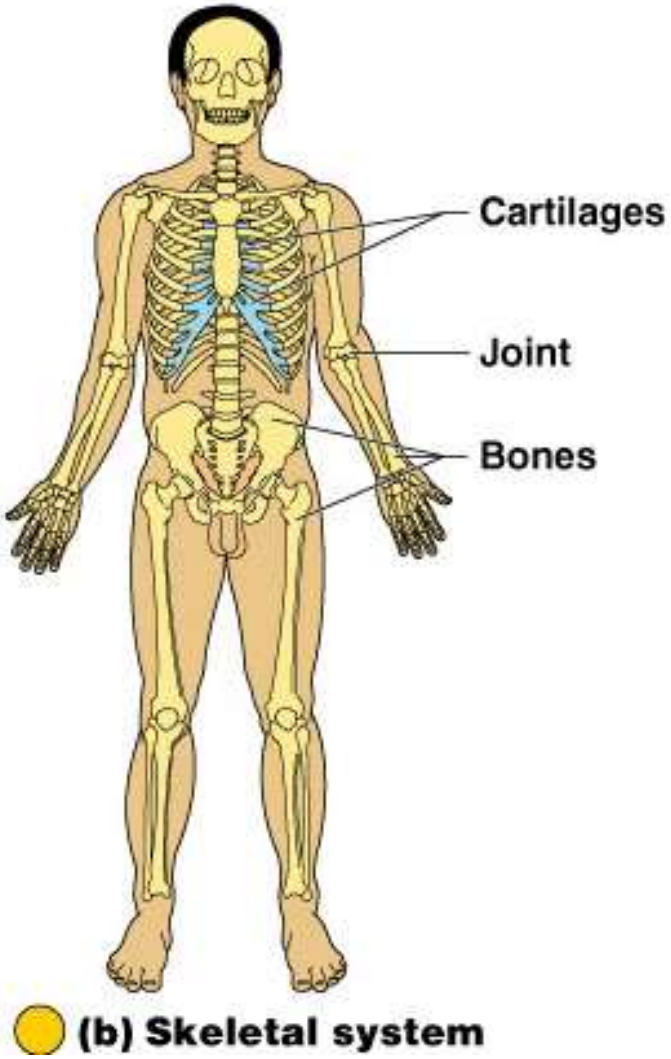


(a) Integumentary system

2-SKELETAL

ORGANS

- **Bones, Cartilages, Ligaments, Joints**



FUNCTIONS

- **Protects & supports body organs**
- **Framework for muscles & movement**
- **Hematopoiesis; store minerals**

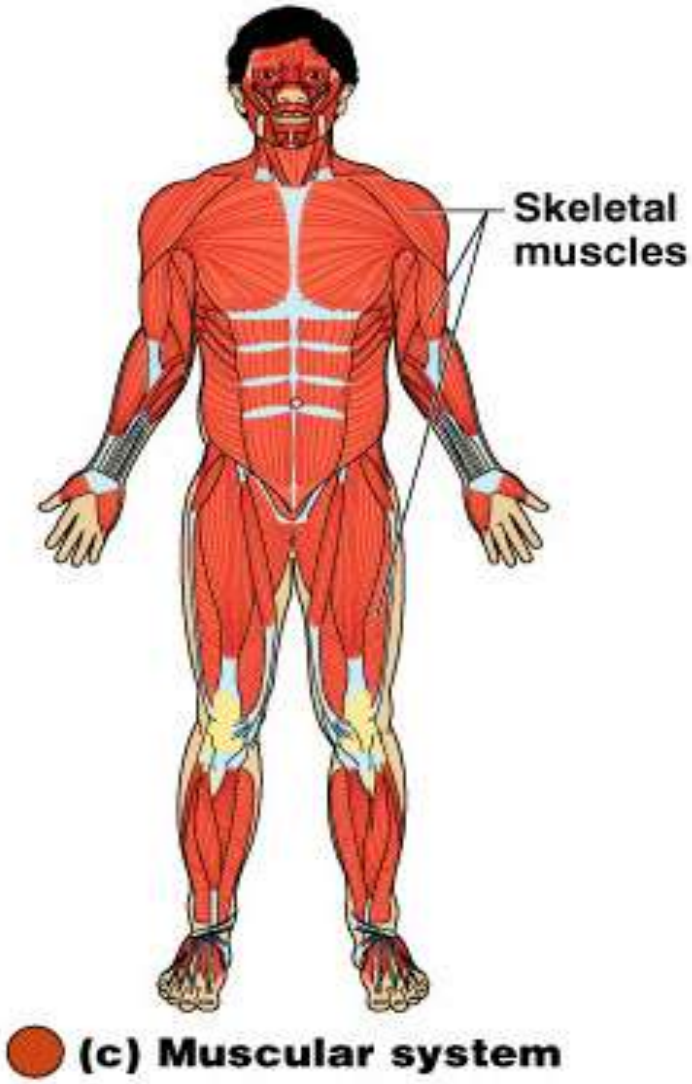
3- MUSCULAR

ORGANS

- **Skeletal Muscle (attached to bone)**

FUNCTIONS

- **Contraction & mobility (locomotion)**
- **Facial expression, posture**
- **Produce body heat**



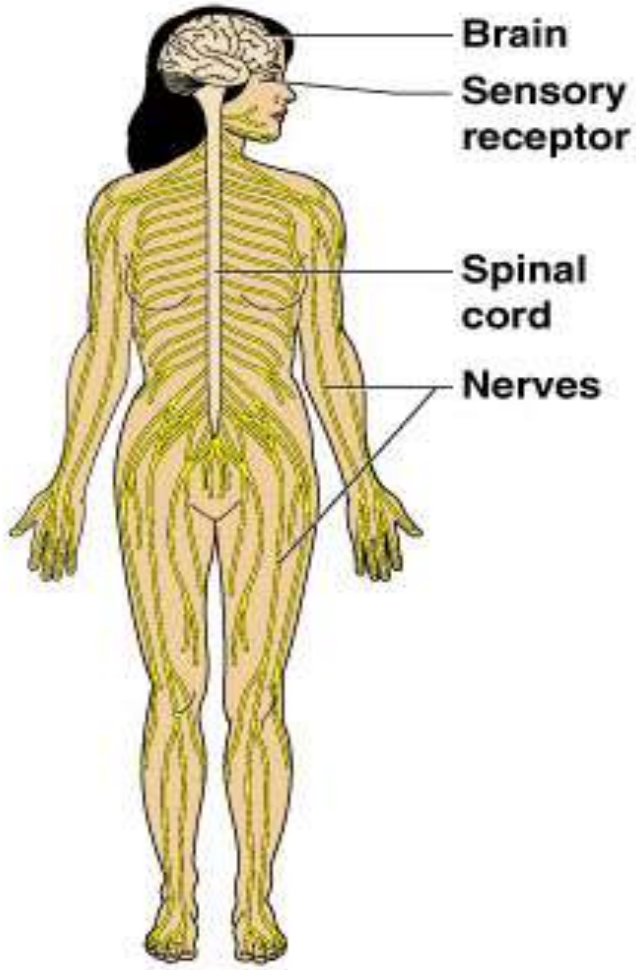
4- NERVOUS

ORGANS

- **Brain, Spinal cord, Nerves, & Sensory Receptors**

FUNCTIONS

- **Fast-acting central control system**
- **Responds to external/internal stimuli via nerve Impulses (electrical messages)**



(d) Nervous system

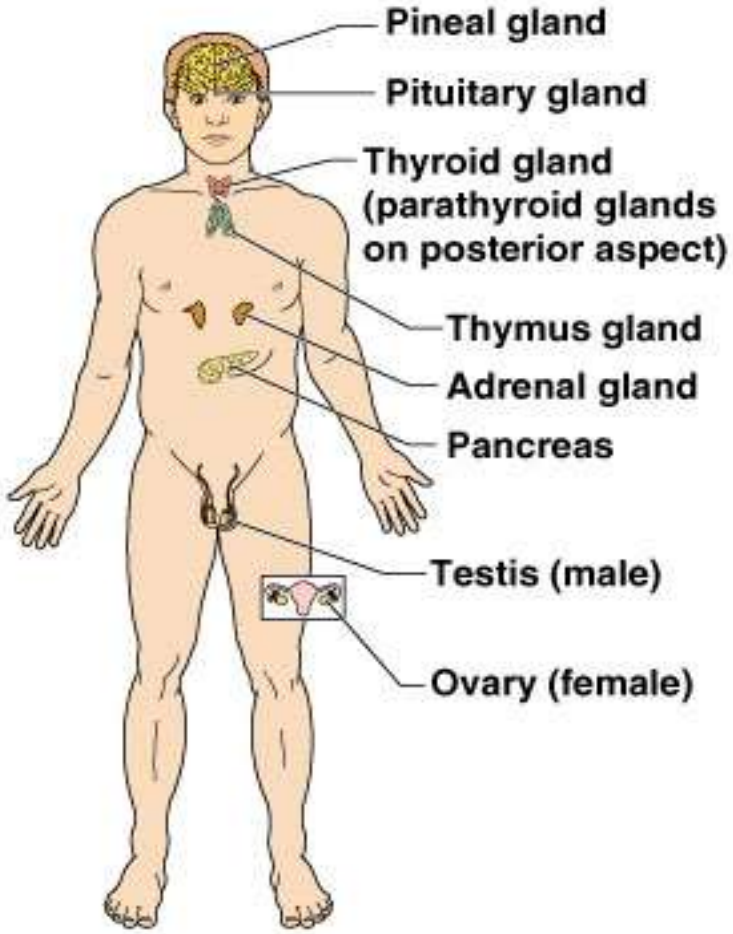
5- ENDOCRINE

ORGANS

- **Pituitary, Thyroid, Parathyroid, Adrenals, Thymus, Pancreas, Pineal, Ovaries, Testes…..etc.**

FUNCTIONS

- **Slow -acting control system**
- **Glands produce hormones that regulate growth, reproduction, metabolism,…. etc.**



(e) Endocrine system

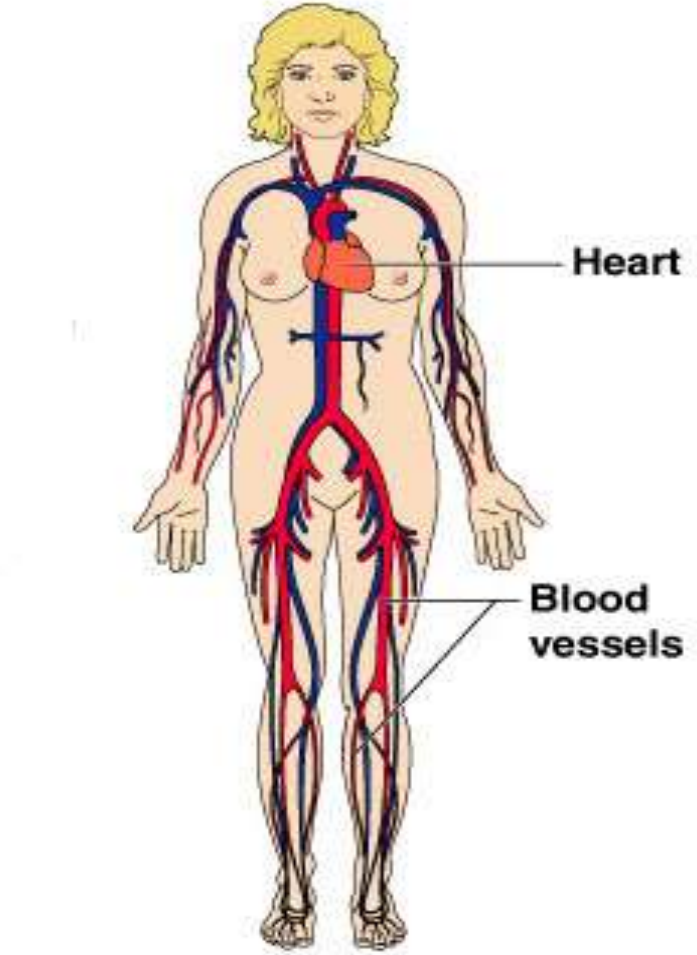
6- Circulatory

ORGANS

- **Heart, Blood vessels, Capillaries & Blood**

FUNCTIONS

- **Carries O_2 nutrients, hormones, & other substances to and from tissue cells**
- **White blood cells protect against bacteria, toxins, tumors**

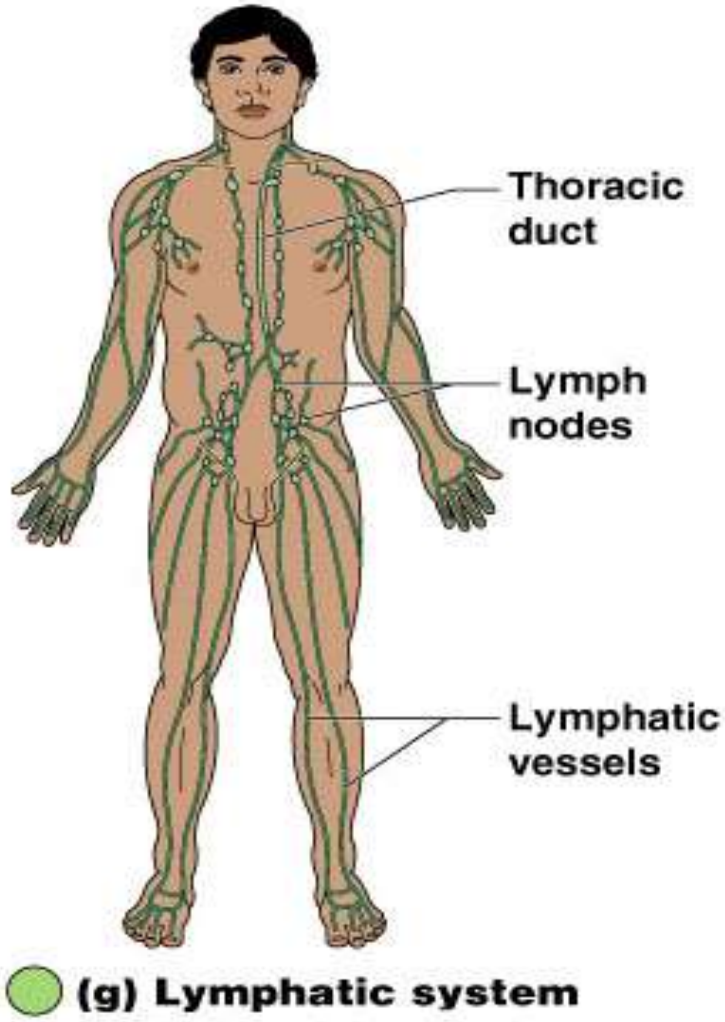


(f) Cardiovascular system

7- LYMPHATIC

ORGANS

- **Lymphatic vessels, Lymph nodes, Spleen, Tonsils**



FUNCTIONS

- **Complements circulatory system by returning leaked fluid back to blood vessels**
- **Cleanses the blood; involved in immunity**

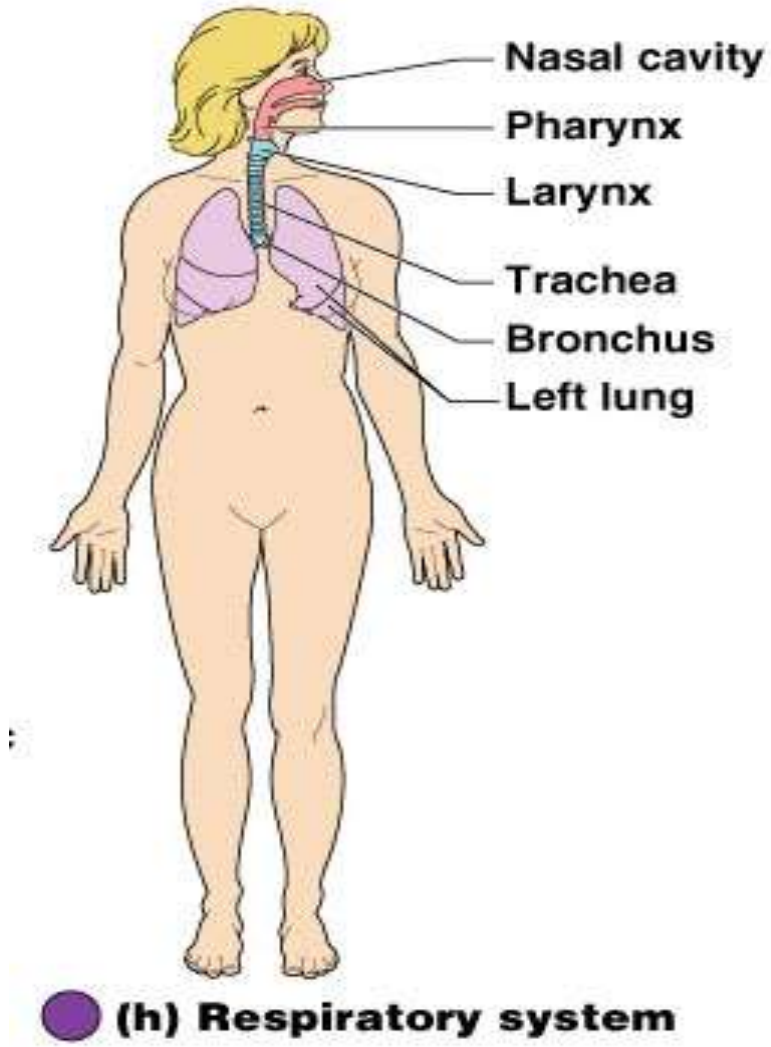
8- RESPIRATORY

ORGANS

- **Nasal cavity, Pharynx, Larynx, Trachea, Bronchi, & Lungs**

FUNCTIONS

- **Keeps blood supplied with O_2 & removes CO_2**
- **Carries out gas exchanges through air sacs in lungs**



(h) Respiratory system

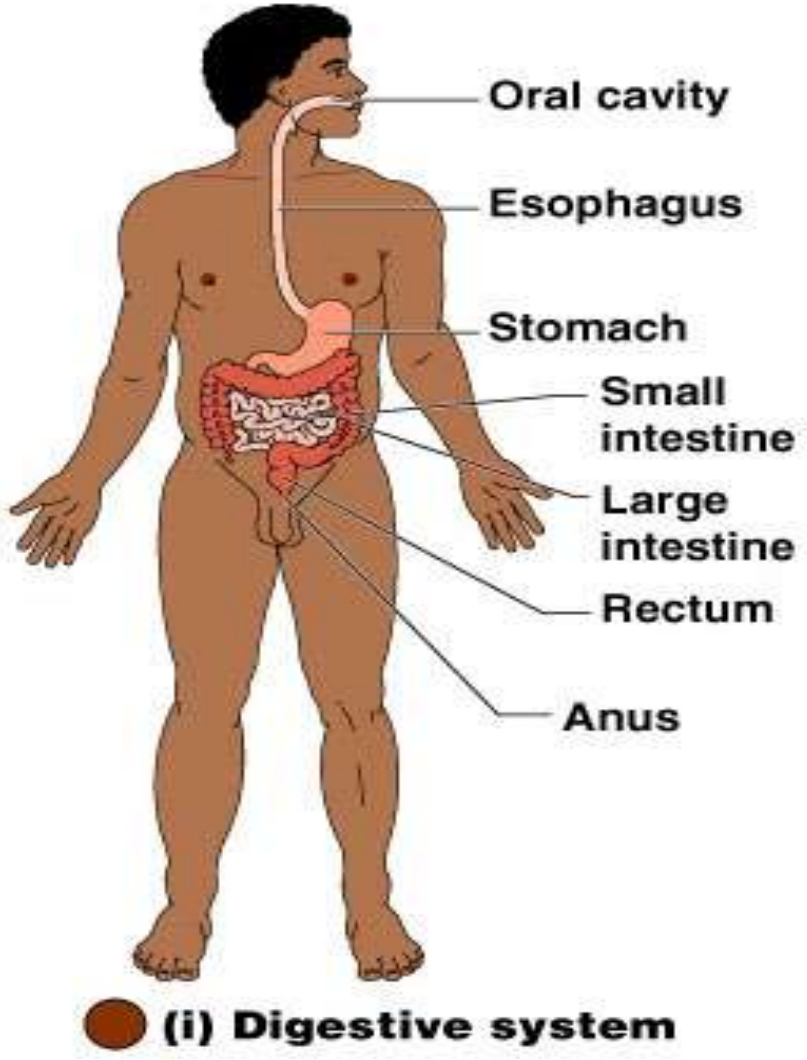
9- DIGESTIVE

ORGANS

- **Oral cavity, Esophagus, Stomach, Small intestine, Large intestine, Rectum, Anus (Liver & Pancreas)**

FUNCTIONS

- **Breaks food down into absorbable units that enter the blood; indigestible food eliminated as feces**



(i) Digestive system

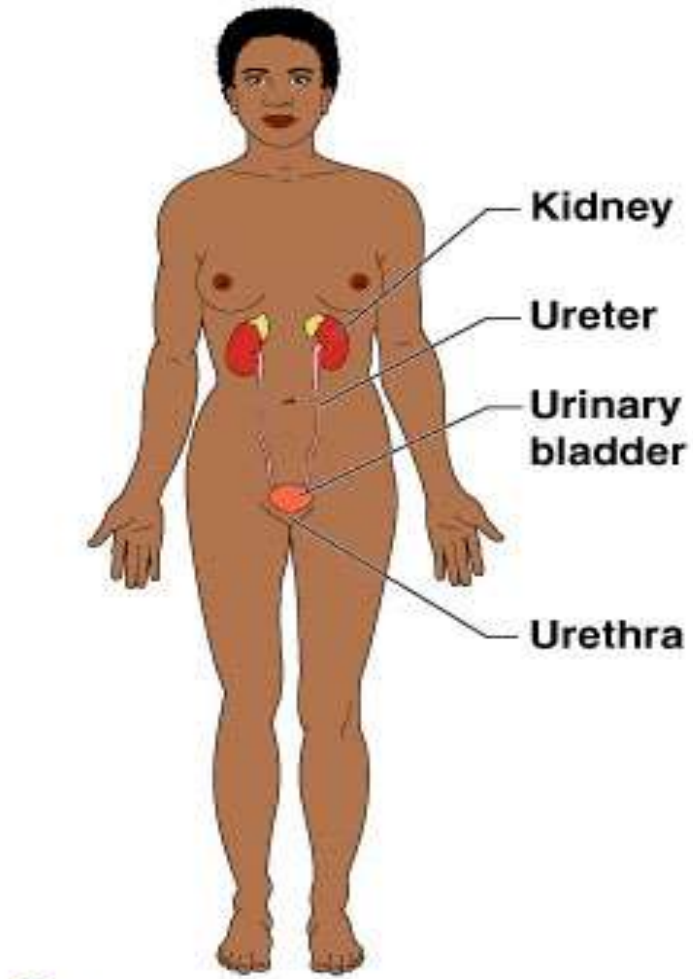
10- URINARY (EXCRETORY)

ORGANS

- **Kidney, Ureter, Urinary bladder, Urethra**

FUNCTIONS

- **Eliminates nitrogenous waste from the body (urea & uric acid)**
- **Regulates water, electrolytes, & acid-base balance of the blood**



(j) Urinary system

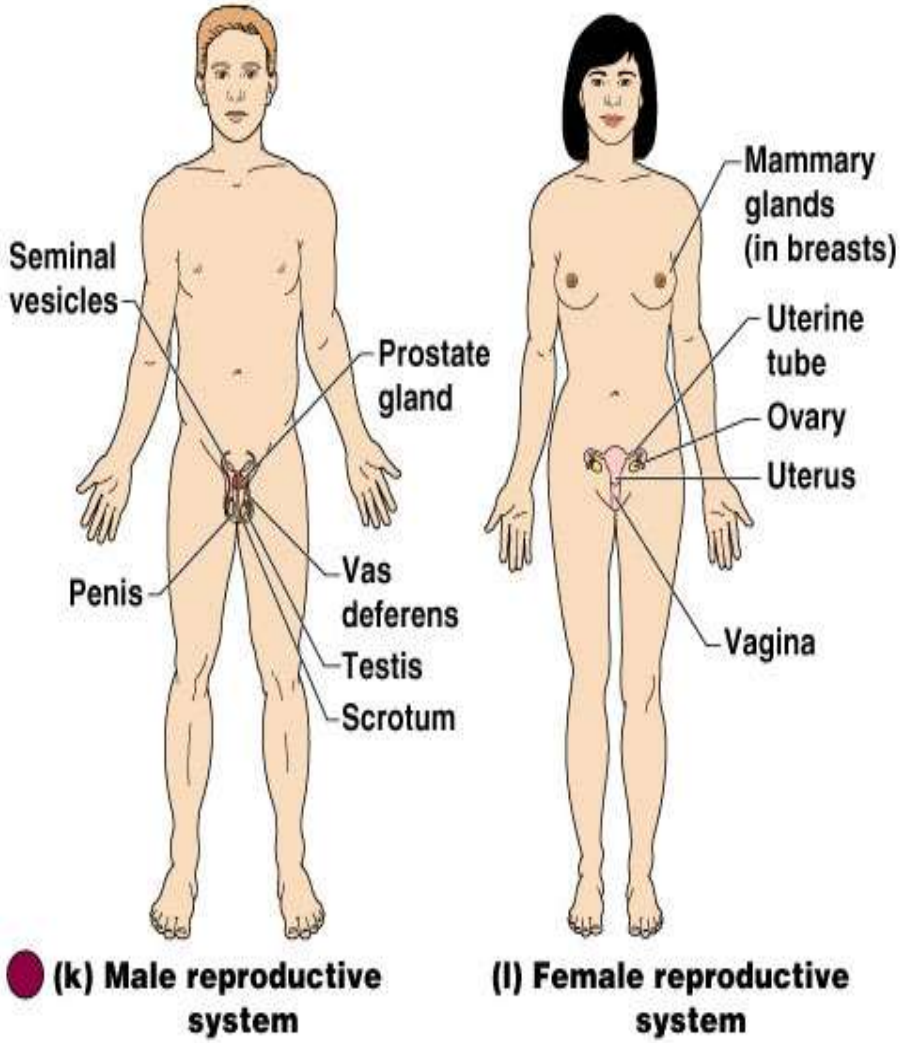
11- REPRODUCTIVE

ORGANS

- **Male**
  - **Seminal Vesicles, Prostate, Penis,**
  - **Vas deferens, Testis, Scrotum**
- **Female**
  - **Ovaries, Mammary glands, Uterus,**
  - **Vagina, Uterine tube**

FUNCTIONS

- **Primary function for both sexes is to produce offspring**
- **Male – testes produce sperm & male sex hormones**
- **Female – ovaries produce eggs & female sex hormones;**
- **mammary glands for nourishment**



Anatomical Position

Standing erect

Feet parallel

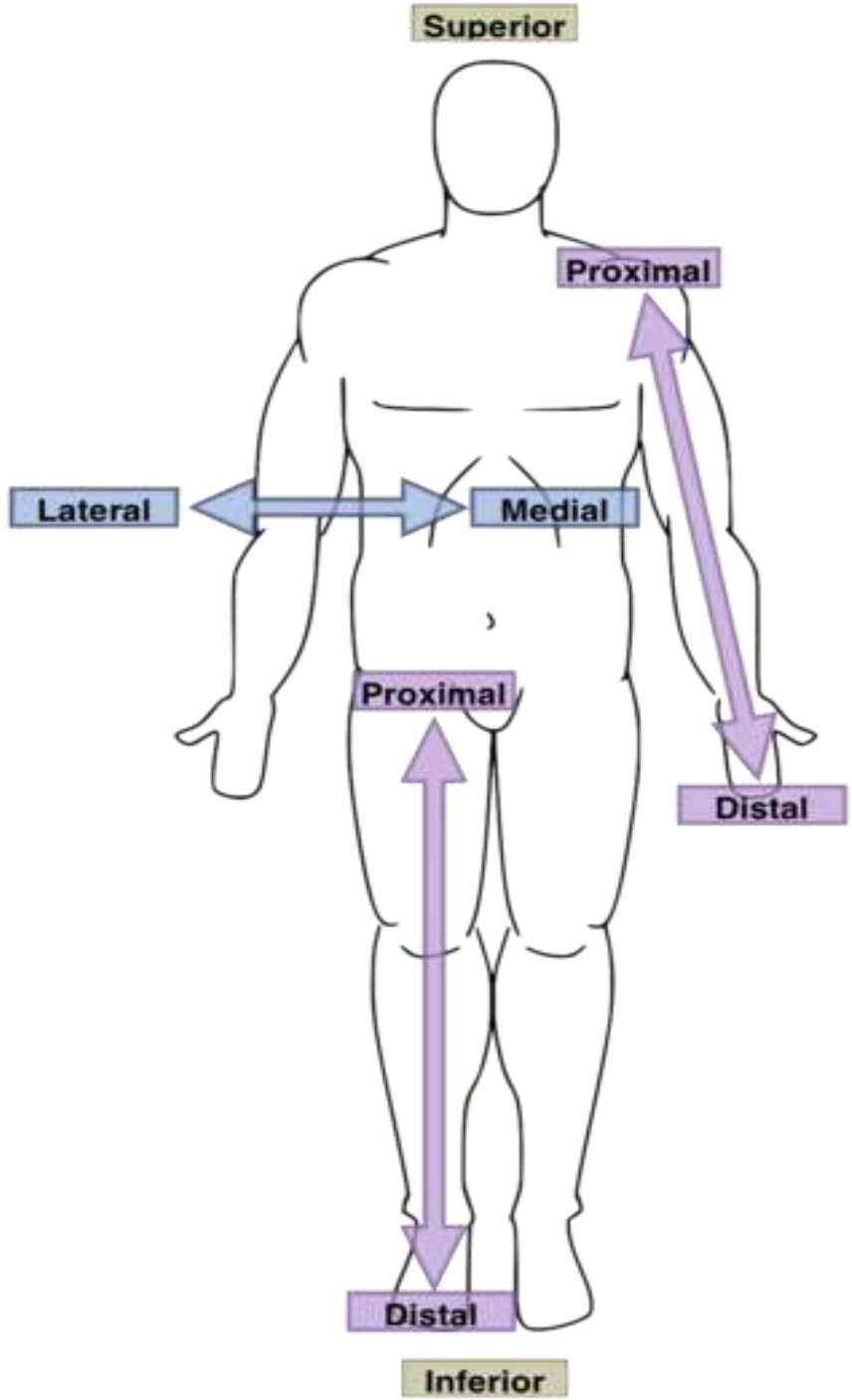
Arms hanging at the sides

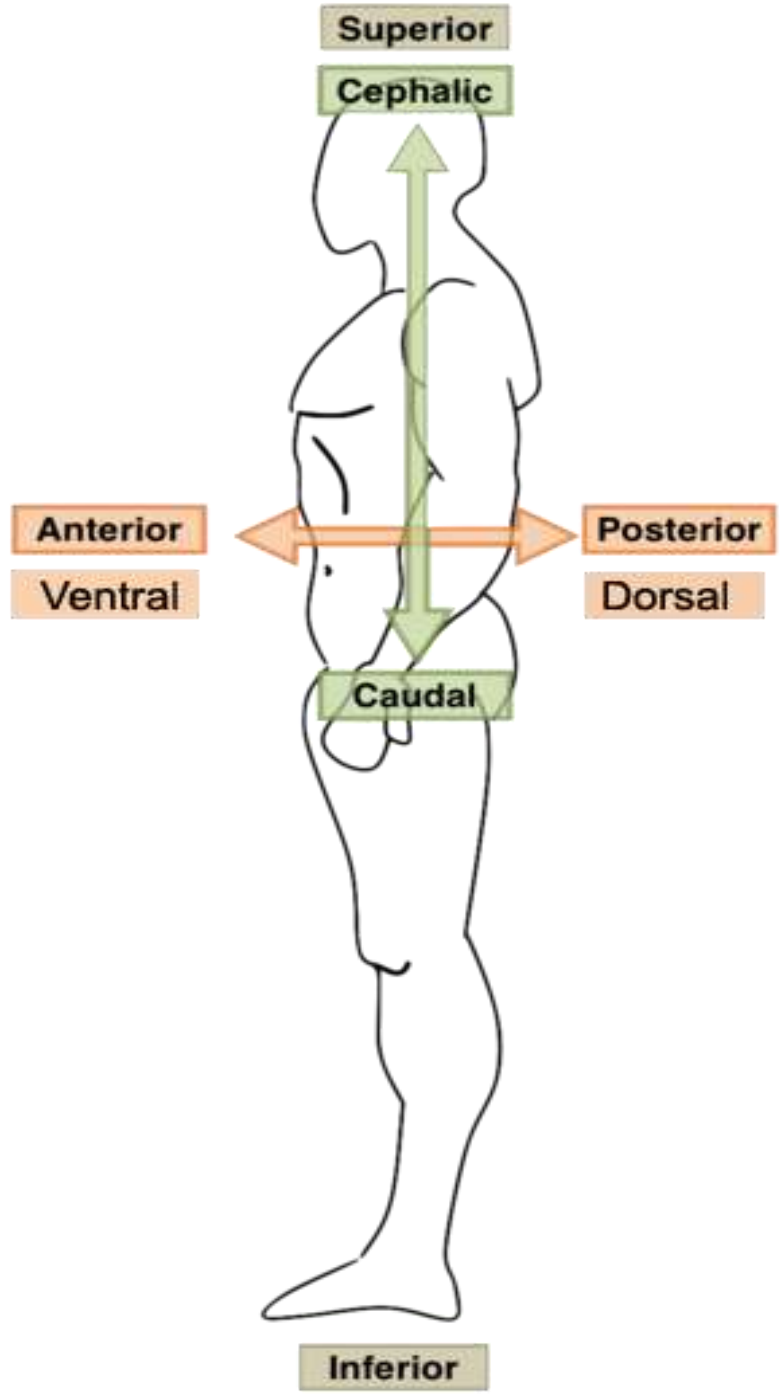
Palms facing forward

Directional terms

- **Superior (cranial or cephalad) – toward the head end or upper part of a structure or body; above**
- **Inferior (caudal) – away from the head end or toward the lower part of a structure or body; below**
- **Anterior (ventral) – toward or at the front of the body; in front of**
- **Posterior (dorsal) – toward or at the backside of the body; behind**
- **Medial – toward or at the midline of the body; on the inner side of**
- **Lateral – away from the midline of the body; on the outer side of**

- **Proximal – close to the origin of the body part or the point of attachment of a limb to the body trunk.**
- **Distal – farther from the origin of a body or the point of attachment of a limb to the body trunk.**
- **Superficial (external) – toward or at the body surface.**
- **Deep (internal) – away from the body surface; more internal.**


Superior
Proximal
Lateral
Medial
Proximal
Distal
Distal
Inferior


Superior
Cephalic
Anterior
Ventral
Posterior
Dorsal
Caudal
Inferior

Examples:

- The navel is inferior to the breastbone
- The heart is posterior to the breastbone
- The arms are lateral to the chest
- The elbow is proximal to the wrist
- The skin is superficial to the skeleton
- The forehead is superior to the nose
- The breastbone is anterior to the spine
- The heart is medial to the arm
- The armpit is intermediate between the breastbone and the shoulder
- The knee is distal to the thigh
- The lungs are deep to the rib cage

Body planes and sections

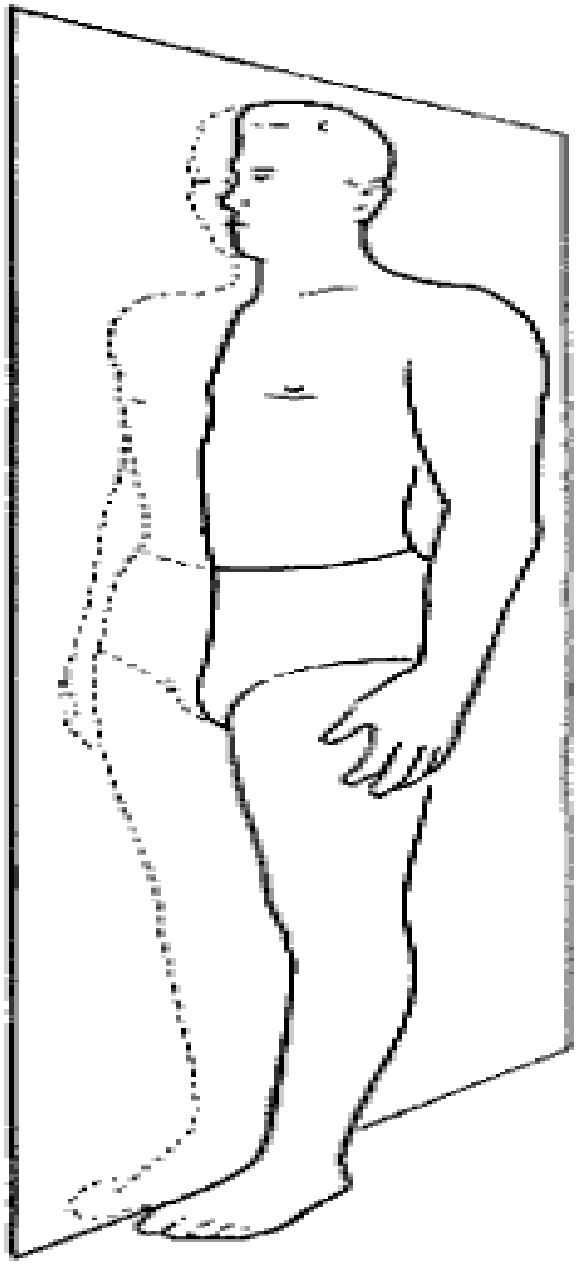
- Sagittal plane – cut made along the lengthwise or longitudinal plane of the body dividing it into left and right parts
- Midsagittal (median) plane – right and left parts are of equal size

- Frontal (coronal) plane – cut made along a lengthwise plane that divides the body into anterior and posterior parts

- Transverse plane (cross section) – cut made along a horizontal plane dividing the body or organ into superior and inferior parts

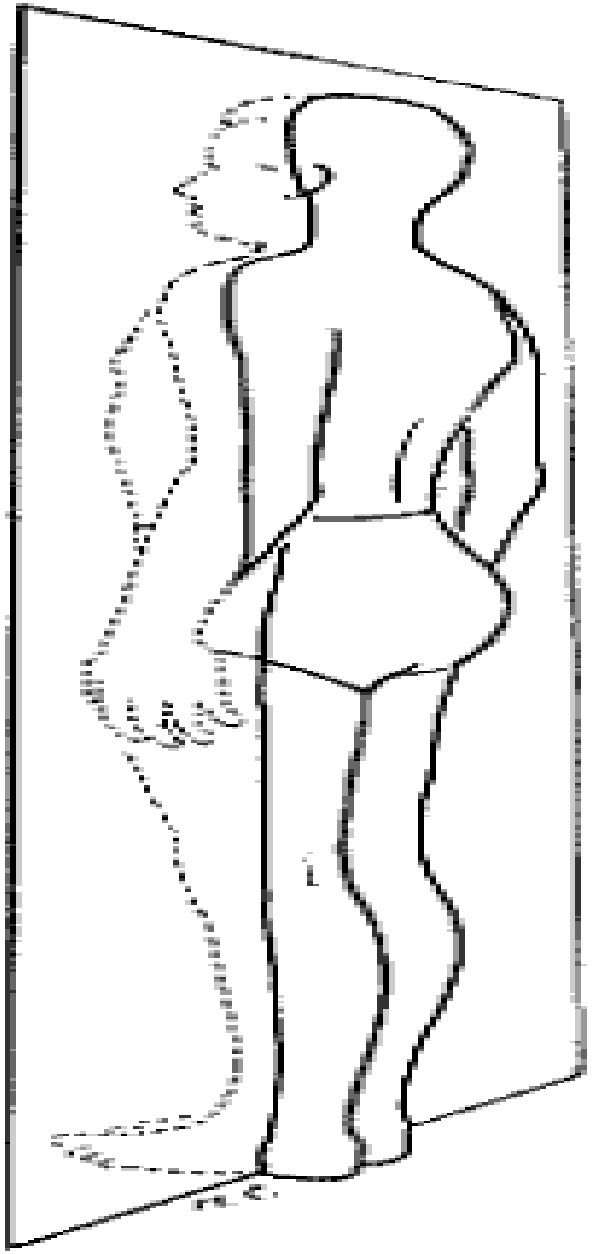
- Sagittal Plane – divides body into right and left parts.

- Midsagittal = Median plane –divides body into two equal halves.



Sagittal/Anteroposterior Plane

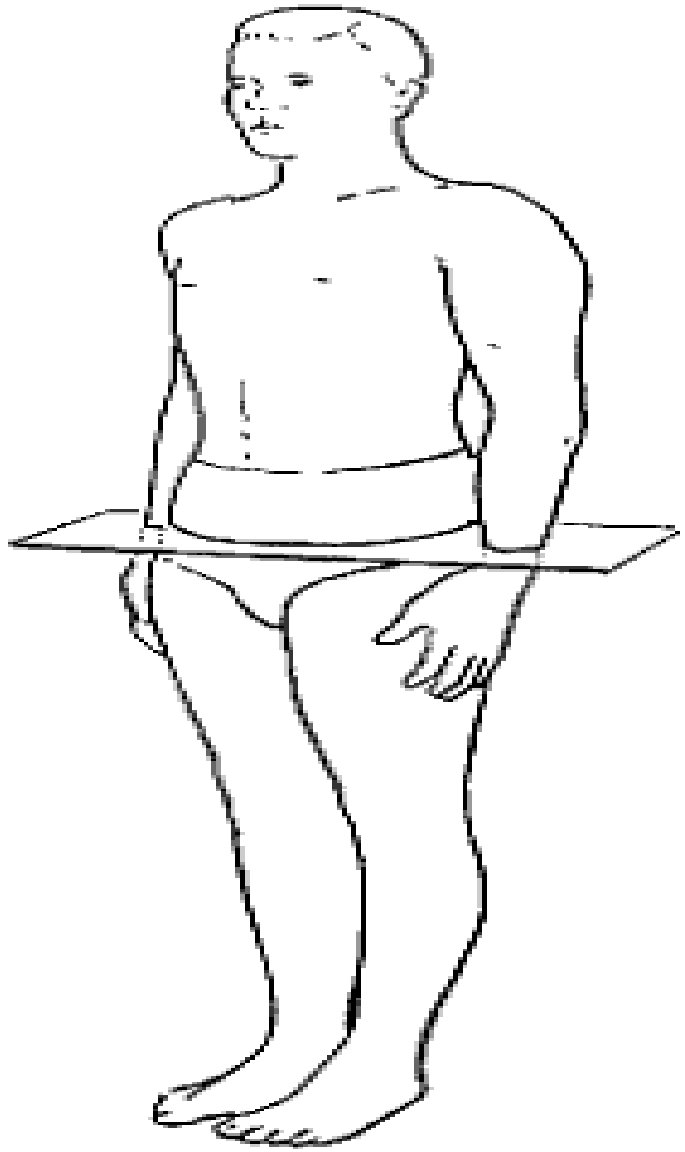
- Frontal = coronal plane – divides body into anterior and posterior parts



Frontal/Lateral Plane

- Transverse plane = cross Section= horizontal section

divides into upper and lower parts



Horizontal/Transverse Plane

Body Cavities

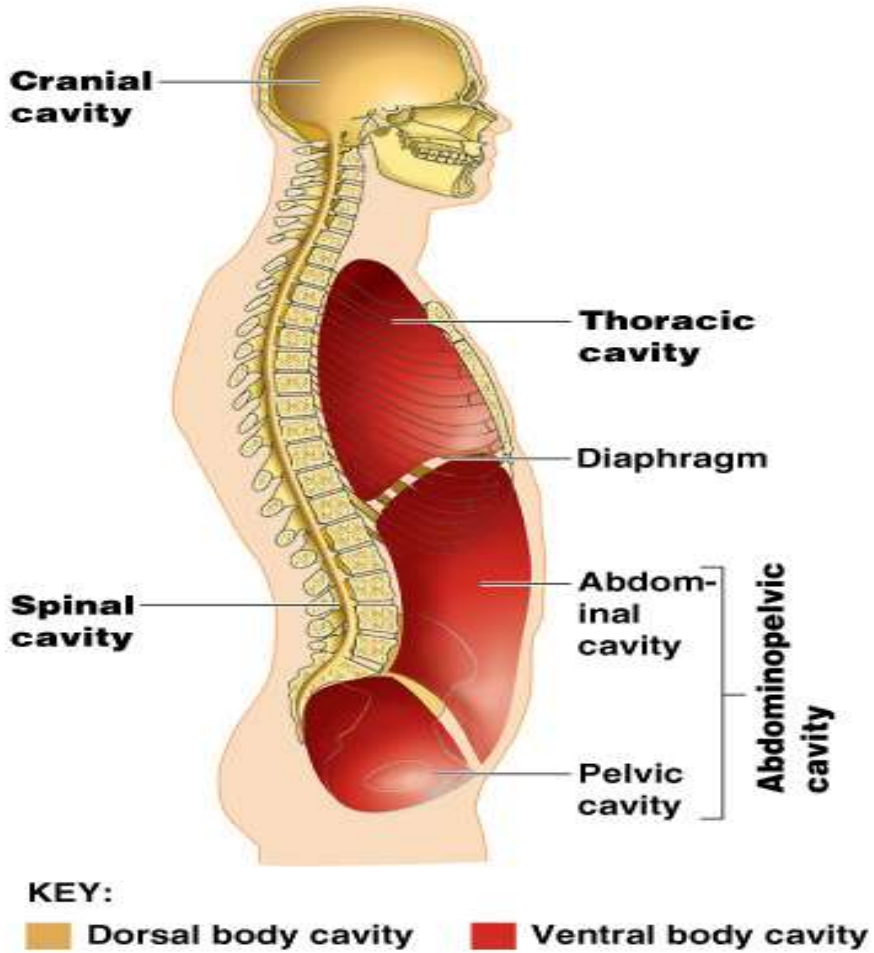
1-Dorsal Body Cavity

Which protects the fragile nervous system organs has two subdivisions. The ***cranial cavity***, in the skull, encases the brain. ***The vertebral, or spinal*****,** cavity, which runs within the bony vertebral column, encloses the delicate spinal cord. The cranial and spinal cavities are continuous with one another

2- Ventral Body Cavity

The more anterior and larger of the closed body cavities is the **ventral body cavity** .It has **two** major subdivisions, the ***thoracic*** and the ***abdominopelvic*** cavities. It houses internal organs collectively called the **viscera** .

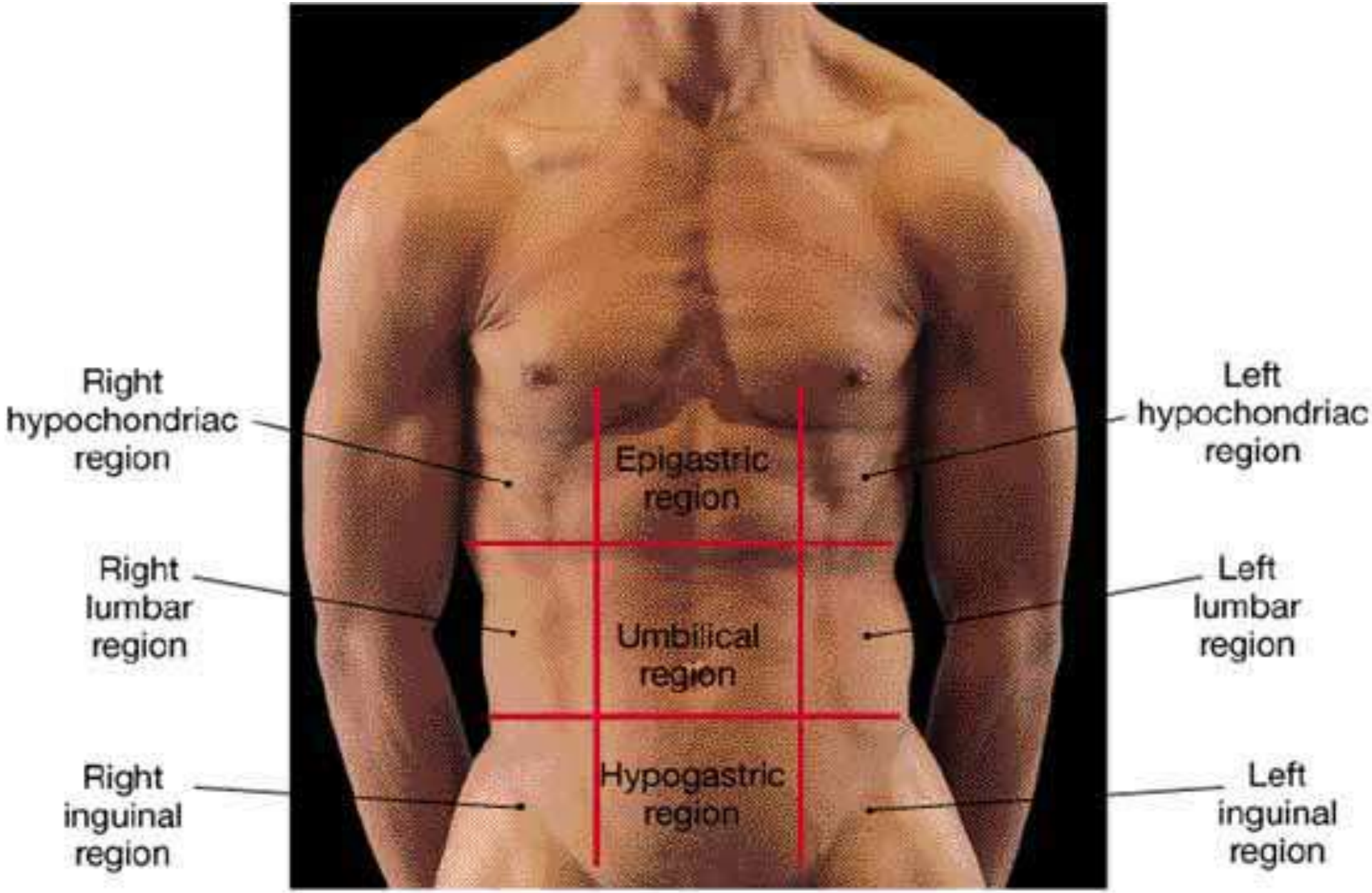
- They are separated by the **diaphragm,** a dome-shaped muscle important in breathing.
- The abdominopelvic cavity, as its name suggests, has two parts ***not physically separated*** by a muscular or membrane wall.
- The inferior part, **the pelvic cavity,** lies in the bony pelvis .



Abdominopelvic Regions and Quadrants

- Because the abdominopelvic cavity is **large** and contains several organs, it helps to divide it into smaller areas for study.

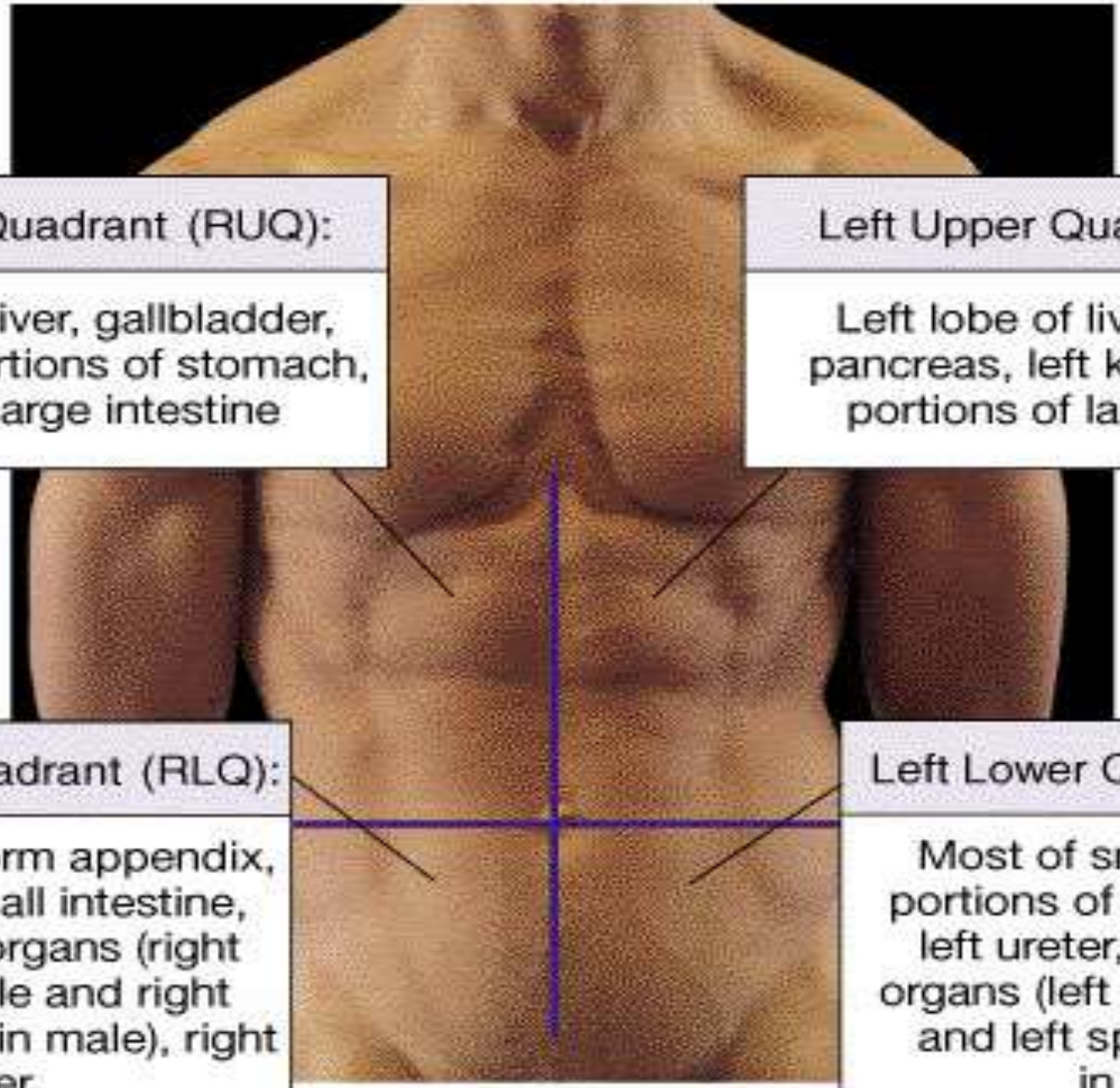
- ***One division method***, used primarily by anatomists, uses two transverse and two parasagittal planes. These planes, divide the cavity into ***nine regions*** :
- -The **umbilical** region is the centermost region deep to and surrounding the umbilicus (navel).


Right hypochondriac region
Epigastric region
Left hypochondriac region
Right lumbar region
Umbilical region
Left lumbar region
Right inguinal region
Hypogastric region
Left inguinal region

(b)

- -The **epigastric** region is located superior to the umbilical region (epi = upon, above; gastri = belly).
- -The **hypogastric** (pubic) region is located inferior to the umbilical region (hypo = below).
- -The right and left **iliac**, or **inguinal,** regions (ing'gwĭ-nal) are located lateral to the hypogastric region (iliac = superior part of the hip bone).
- -The right and **left lumbar regions** lie lateral to the umbilical region (lumbus = loin).
- -The right and left **hypochondriac** regions flank the epigastric region laterally (chondro = cartilage).

- A simpler scheme to localize the abdominopelvic cavity organs is to imagine one transverse and one median sagittal plane pass through the **umbilicus** at right angles. The resulting quadrants are named according to their positions from the subject's point of view:
-
- **Right upper** quadrant (RUQ), **Left upper** quadrant (LUQ),
- **Right lower** quadrant (RLQ), and **Left lower** quadrant (LLQ).



Right Upper Quadrant (RUQ):	Left Upper Quadrant (LUQ):
Right lobe of liver, gallbladder, right kidney, portions of stomach, small and large intestine	Left lobe of liver, stomach, pancreas, left kidney, spleen, portions of large intestine
Right Lower Quadrant (RLQ):	**Left Lower Quadrant (LLQ):**
Cecum, vermiform appendix, portions of small intestine, reproductive organs (right ovary in female and right spermatic cord in male), right ureter	Most of small intestine, portions of large intestine, left ureter, reproductive organs (left ovary in female and left spermatic cord in male)

(a)

Levels of Organization

Chemical level

Cellular level

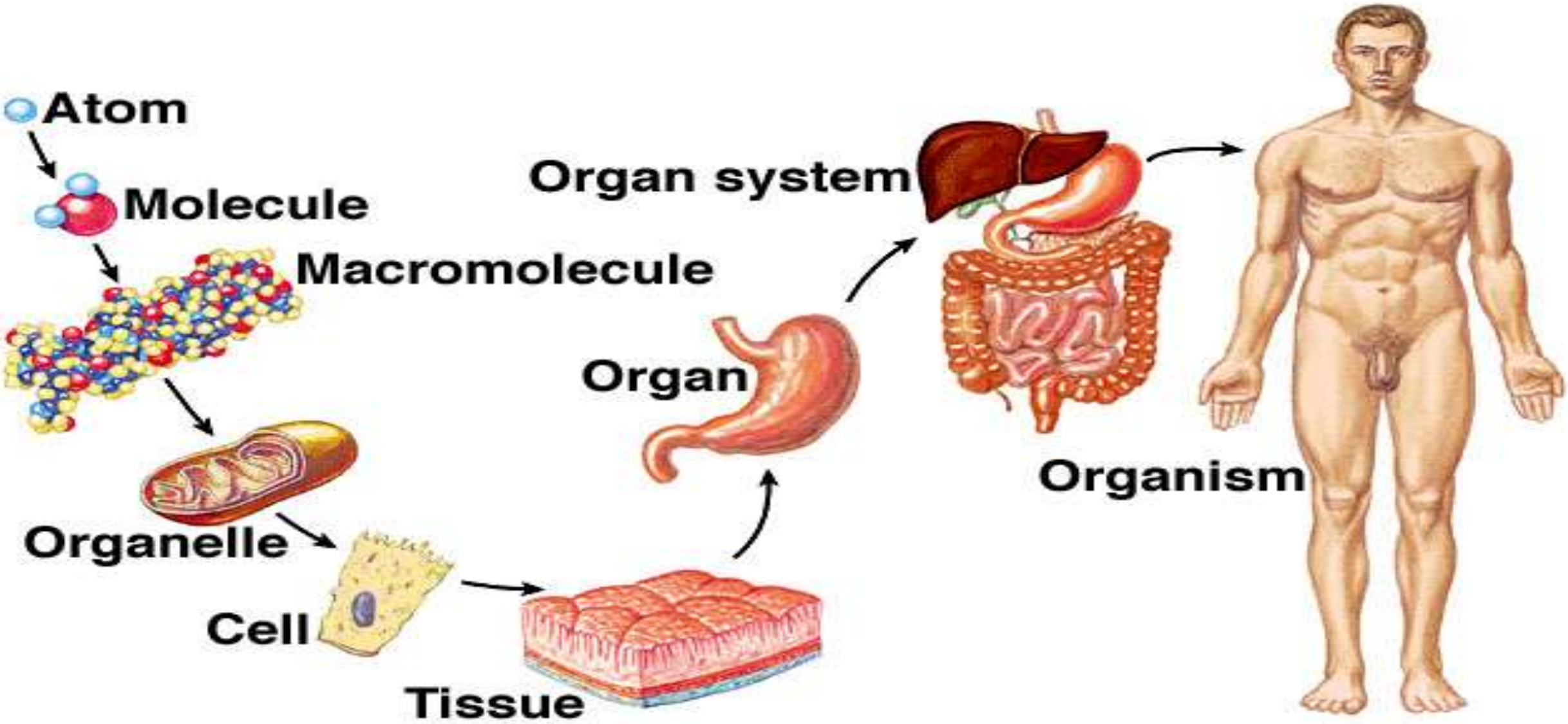
Tissue level

Organ level

Organ system level

Organism level

Organization of Human Body



Thank You