Chapter 2

The Human Body in Health and Disease

Anatomic Reference Systems

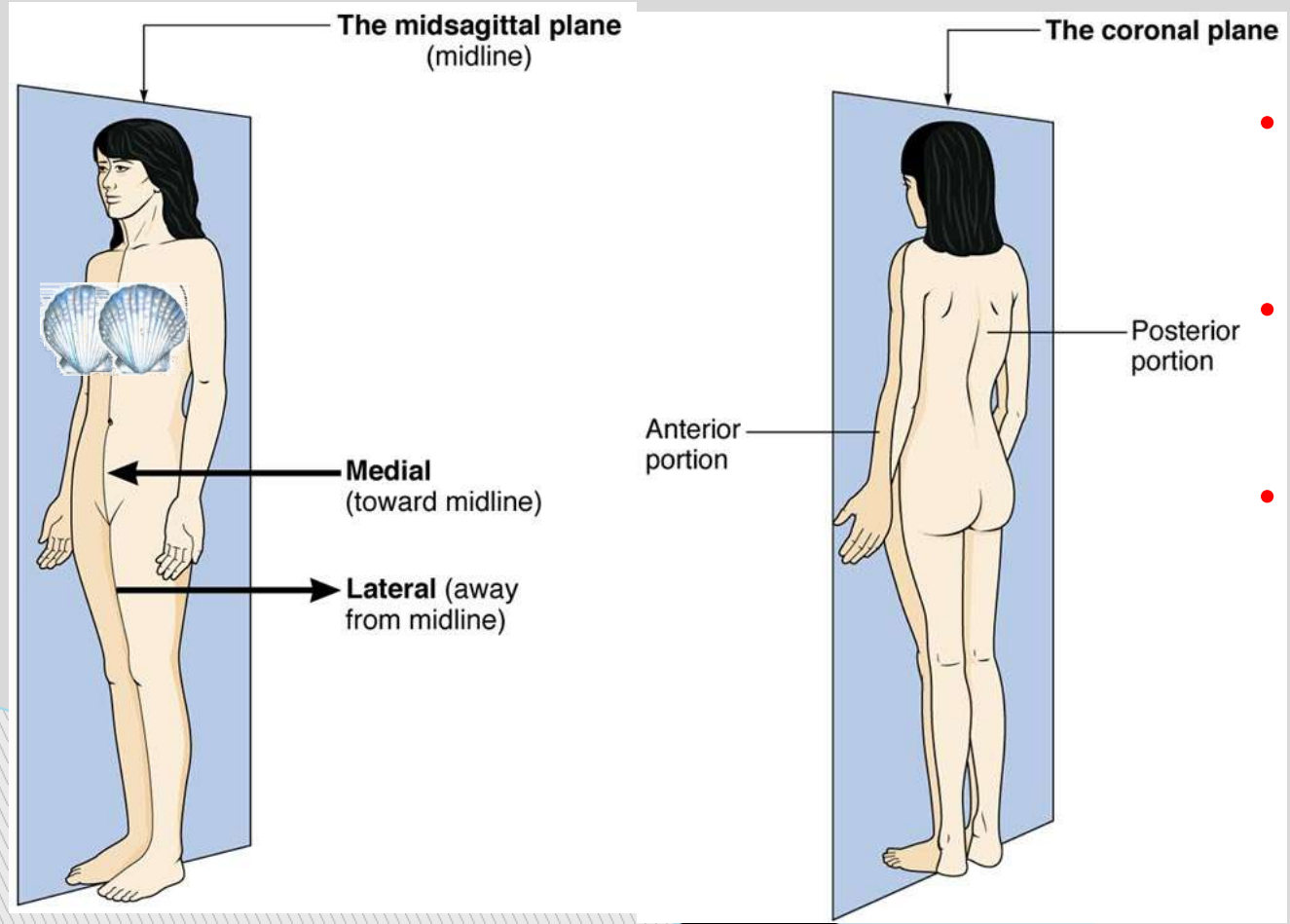
Describe the location and functions of body parts using:

- Body planes
- Body directions
- Body cavities
- Structural units

- **Anatomy** is the study of the structures of the body
- **Physiology** is the study of the functions of these structures
- Descriptions of the body are based on the **anatomic position** – standing up, facing forward, arms at sides and palms forward.

Body Planes

Ventral Planes – an up and down line

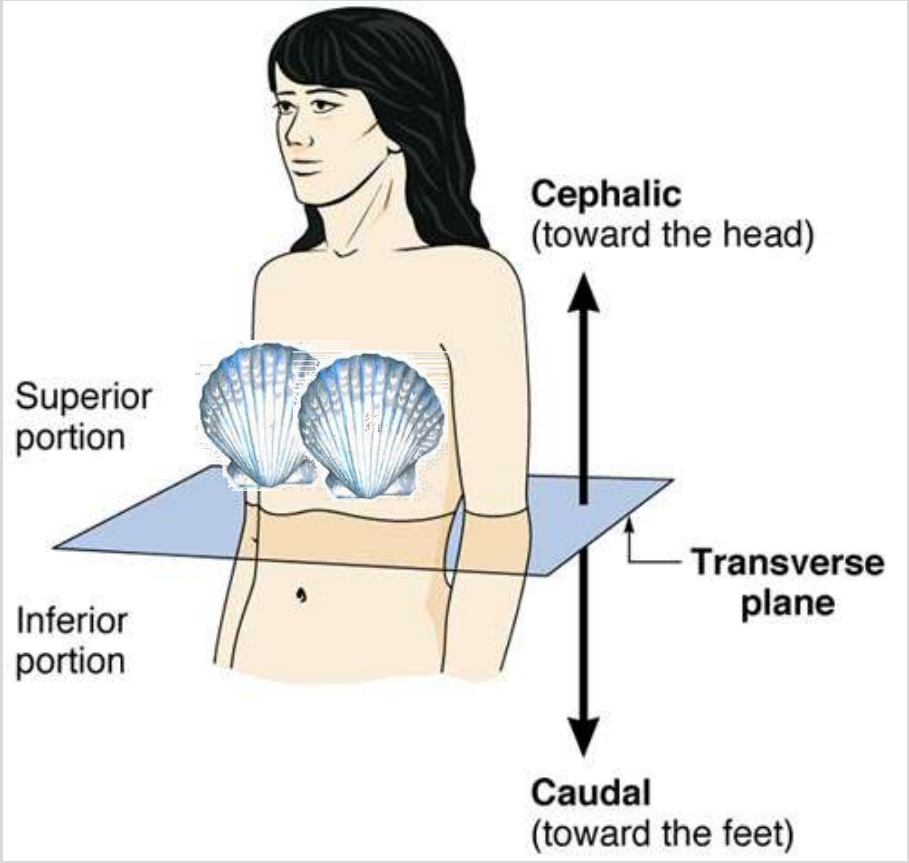


- **Midsagittal** – cuts body into equal left and right sides
- **Sagittal** – cuts but into unequal left and right sides
- **Coronal/Frontal** – cuts body into front and back sides

Body Planes

Horizontal Planes – a flat crosswise line like the horizon

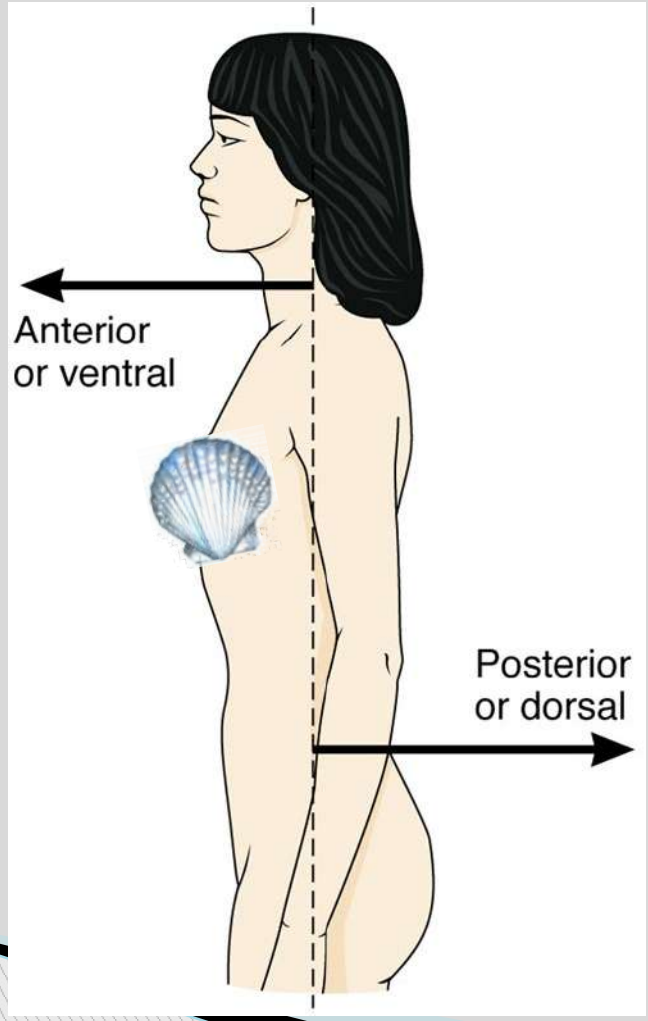
Transverse plane – also known as a horizontal plane, cuts the body into top and bottom halves (does not have to be equal)

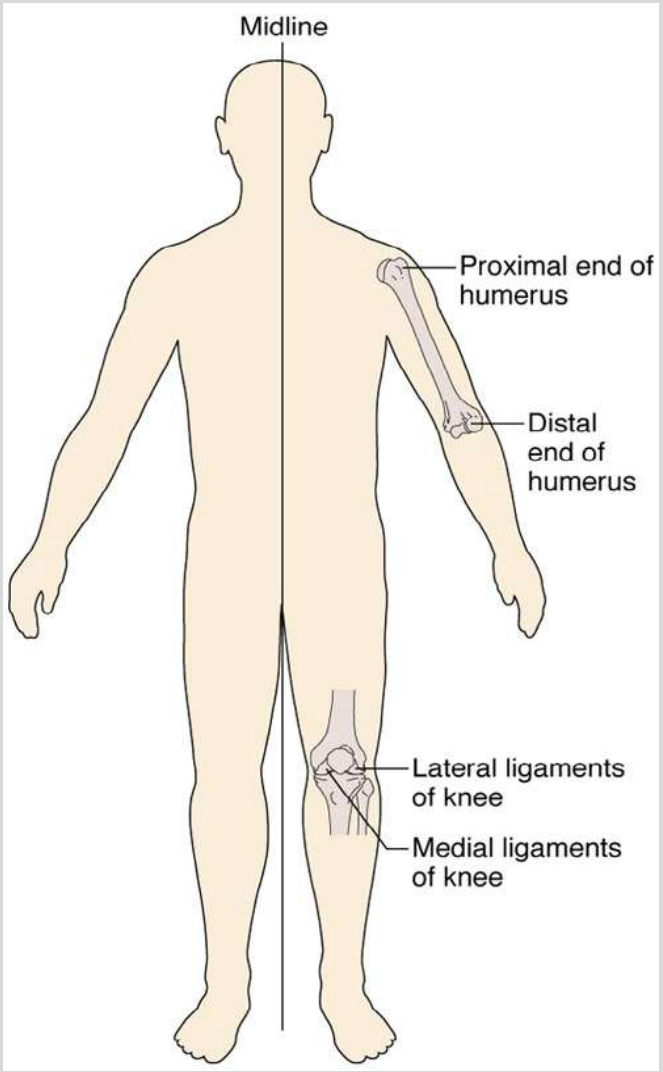


Body Directions

Body Directions	
Ventral (ventr; -al) refers to the front (or belly) side of the body or organ.	**Dorsal** (dors; -al)refers to the back of the body or organ.
Anterior (anter; -ior) means situated in the front. Also means forward part of organ.	**Posterior** (poster; -ior) means situated in the back. Also means the back part of the organ.
Superior means uppermost, above or toward head.	**Inferior** means lowermost, below or towards the feet.
Cephalic (cephal; -ic) means towards the head.	**Caudal** (caud; -al) means towards the lower part of the body.
Proximal means situated nearest the midline or beginning of a structure.	**Distal** means situated farthest from the midline or end of a structure.
Medial means the direction toward or nearer the midline.	**Lateral** means the direction toward or nearer the side, away from midline.

Body Directions





Major Body Cavities

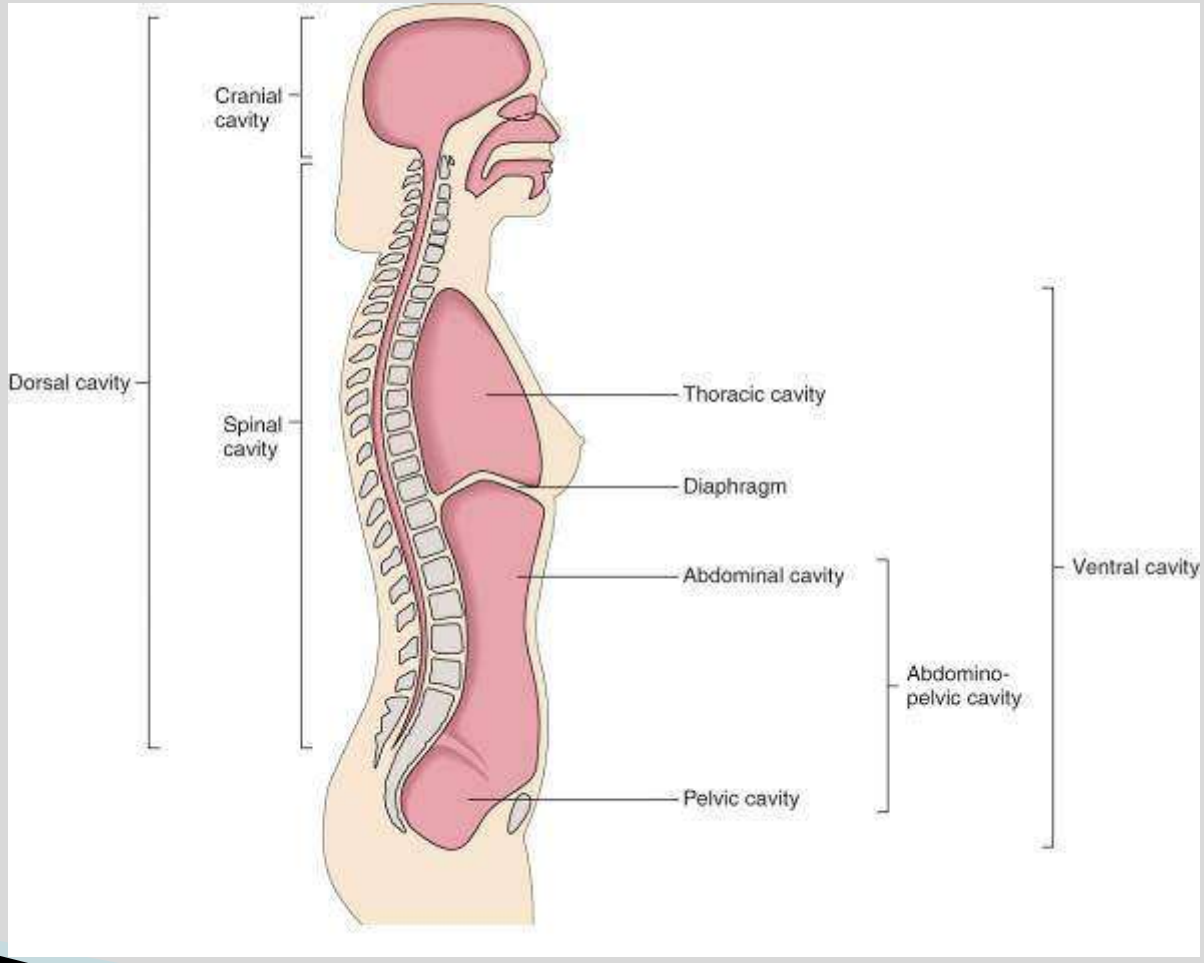
Dorsal Cavity

- Cranial (crani; -al) Cavity is located within the skull
- Spinal Cavity is located within the spinal column

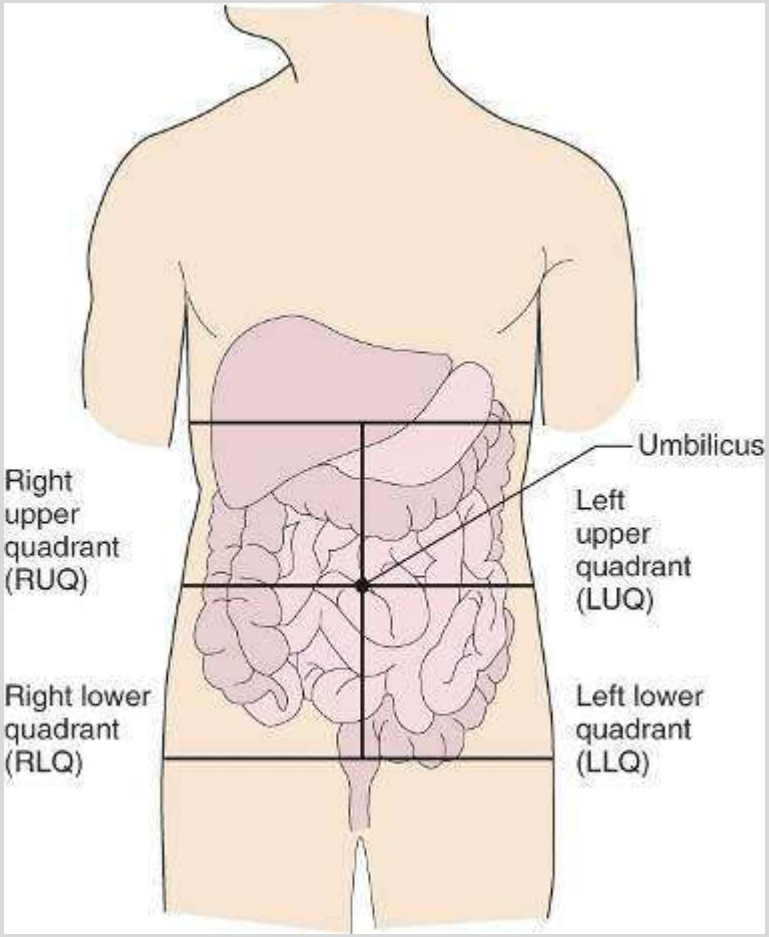
Ventral Cavity has 3 parts and contains many of the organs that maintain homeostasis (constant internal environment)

- Thoracic (thorac; -ic) Cavity or chest cavity
- Abdominal (abdomin; -al) Cavity or abdomen
- Pelvic Cavity is the space formed by the pelvic bones.

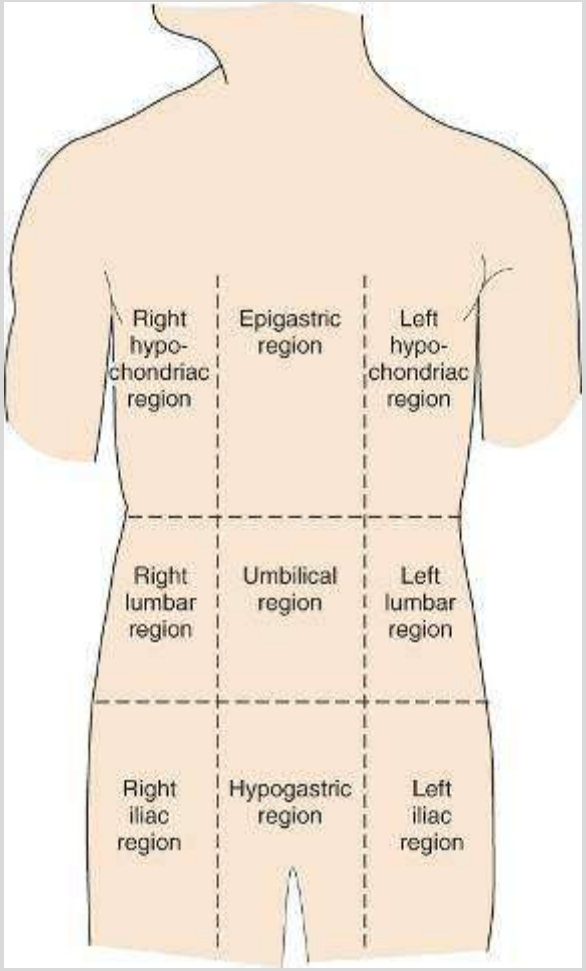
Major Body Cavities



Quadrants of the Abdomen



Regions of the Thorax and Abdomen



Peritoneum

Membrane that protects and supports the organs located in the abdominal cavity

- Periton = peritoneum
  - parietal peritoneum
  - visceral peritoneum
  - mesentery
  - retroperitoneal
  - Peritonitis
  - Ascites

Laparoscopic Procedures

Is the visual examination of the interior of the abdomen with the use of a laparoscope (lapar/o; -scope)

Cytology

The study of the formation, structure, and function of cells, including: (cyt; -ology)

- Chromosomes – 23 pairs
- DNA – 2 long, coiled molecules make up chromosomes. Contain (functional units of heredity).
- Genetics (gene; -tics) is the study of how genes are transferred from parents to child.

Genetic Disorders

Are diseases or conditions caused by a defective gene.

- Cystic Fibrosis
- Down Syndrome (Trisomy 21)
- Hemophilia
- Huntington’s Disease (HD)/Huntington’s Chorea (HC)
- Muscular Dystrophy
- Phenylketonuria
- Sickle Cell Anemia
- Tay-Sachs Disease

Congenital Disorders

Is an abnormal condition that exists as the time of birth

- Developmental Disorders: results from an anomaly or malformation
- Prenatal Influences: mother's health and care she receives before delivery
- Birth Injuries: congenital disorders that were not present before the events surrounding the time of birth

Histology

The study of tissues, which are composed of cells that join together to perform specific functions, including:

*Stem Cells: cells with the ability to divide without limit and to give rise to specialized cells

- Epithelial Tissues - protective covering for all internal and external surfaces of the body. (epithelium and endothelium)
- Connective Tissues – support and connect organs and other body tissues. (dense connective tissue, Adipose (adip; -ose), Loose Connective Tissue, Liquid Connective Tissue
- Muscle Tissue – contains cell material with the specialized ability to contract and relax
- Nerve Tissue – contains cells with the specialized ability to react to stimuli and conduct electrical impulses.

Pathology of Tissue Formation

Aplasia (a-; -plasia)

Hypoplasia

Hyperplasia

Dysplasia

Anaplasia

Glands

Specialized cells that secrete material used elsewhere in the body, including:

- Exocrine Glands secrete their substances into ducts (sweat)
- Endocrine Glands do not have ducts, they flow directly into the bloodstream.

Pathology & Procedures of the Glands

Adenectomy (aden; -ectomy)

Adenitis (-itis)

Adenoma (-oma)

Adenomalacia (-malacia)

Adenosclerosis (-sclerosis)

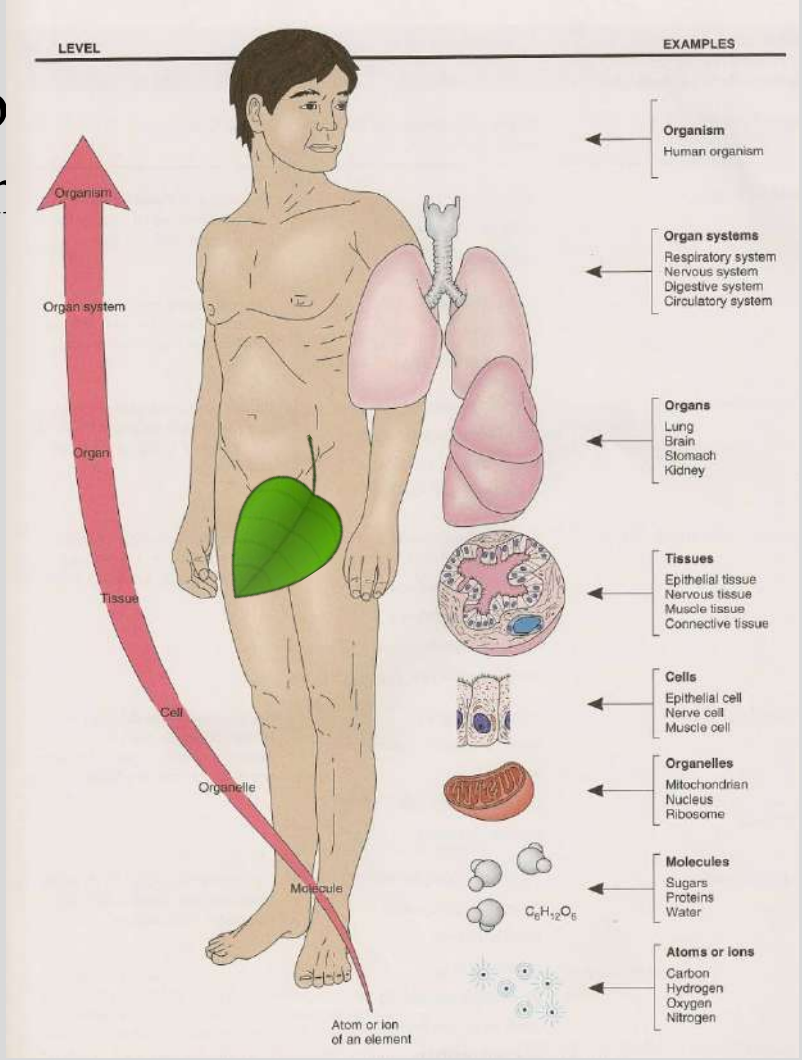
Adenosis (-osis)

Organ and Body Systems

Body parts are organized into systems according to function

Examples:

- Skeletal System
- Muscular System
- Cardiovascular System



Pathology

Is the study of structure and functional changes caused by disease (path/o; -pathy)

- Etiology – study of the causes of disease (eti-; -ology)

Types of Disease

Infectious Disease: illness caused by a pathogenic organism

Idiopathic Disorder: illness with unknown cause

Organic Disorder:there are pathologic, physical changes that explain the symptoms being experienced by the patient

Functional Disorder: no detectable physical changes to explain the symptoms of the patient

Iatrogenic Illness: side effect from a prescribed medical treatment

Nosocomial Infection: infection aquired in a hospital setting that was not present on admission

Disease Transmission

Communicable or contagious- one person to another
Contamination- with an infectious agent
Bloodborne-through contact with blood or body fluids.
STDs
Airborne-droplet contact. Sneezes/coughs
Water or foodborne illnesses-fecal/oral transmission

Outbreaks of Diseases

Endemic- ongoing presence of a disease (common cold)

Epidemic-sudden widespread outbreak (measles)

Pandemic-outbreak of disease over large geographic area (AIDS)