

# **BODY ORGANIZATIONS**

## **CELLS, STRUCTURES, TISSUE, PLANES, DIRECTIONS, CAVITIES**

Health Science 1

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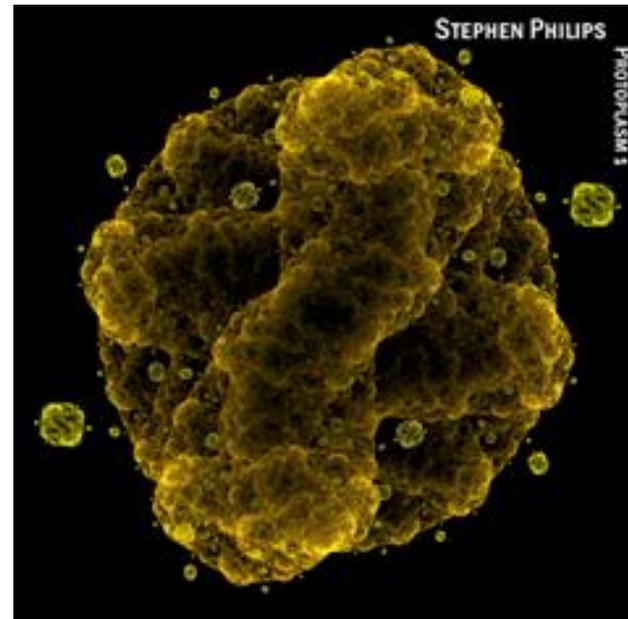
# 7:1 BASIC STRUCTURE OF THE HUMAN BODY

- ◉ The normal function of the human body is compared to an organized machine
- ◉ If the machine malfunctions, disease occurs
- ◉ Anatomy: study of form and structure
- ◉ Physiology: study of processes
- ◉ Pathophysiology: study of how disease occurs and body's response



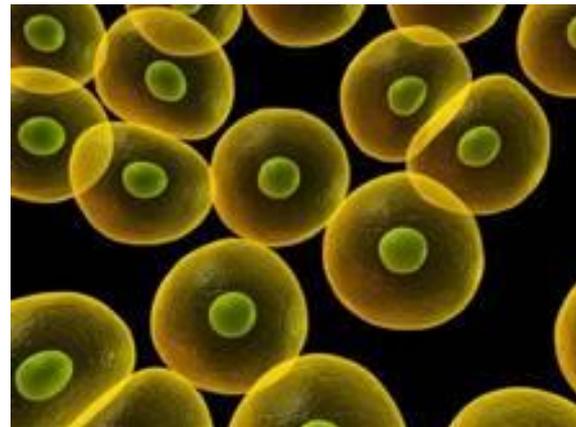
# PROTOPLASM

- ⦿ Basic substance of life
- ⦿ Made of ordinary elements (carbon, oxygen, hydrogen, sulfur, nitrogen, phosphorus)
- ⦿ Scientists can combine these elements, but not create *life*



# CELLS

- ◉ Made of protoplasm which forms the basic structure and function of all living things
- ◉ The CELL: Microscopic structures
  - Carry on all functions of life (food and oxygen, produce heat and energy, eliminate waste)
  - Body contains trillions of cells
  - Vary in shape and size
  - Perform different functions



# BASIC PARTS OF CELLS

- ◉ Cell membrane-outer protective cover and semipermeable
- ◉ Cytoplasm-semifluid in the cell but outside the nucleus
- ◉ Organelles-cell structures that help it function and located in cytoplasm
- ◉ Nucleus-brain of the cell
- ◉ Nucleolus-located inside the nucleus and important for cell reproduction
- ◉ Chromatin-located in the nucleus and made of DNA and protein; forms chromosomes during cell reproduction

# BASIC PARTS OF CELLS

- ◉ Mitochondria-powerhouses of the cell; breakdown carbs, protein, fat to make ATP (energy source of cell)
- ◉ Golgi apparatus-produces, stores, and packages secretions for discharge from cell
- ◉ Endoplasmic reticulum-allows for transport of materials in and out of cell
- ◉ Vacuoles-stores food or waste
- ◉ Lysosomes-contain digestive enzymes for old cells, bacteria, and foreign materials

# TISSUES

- Cells of same type joined together form tissue
  - Tissues are 60%-99% water
  - This water is slightly salty and is called tissue fluid
- 
- Not enough tissue fluid=dehydration
  
  - Too much tissue fluid=edema



# TISSUES

- 4 main groups of tissues
  - Epithelial
  - Connective
  - Nerve
  - Muscle

## Four Types of Tissues



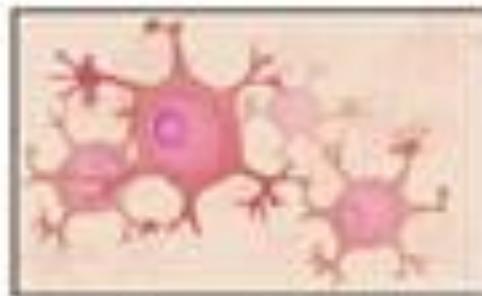
Connective tissue



Epithelial tissue



Muscle tissue



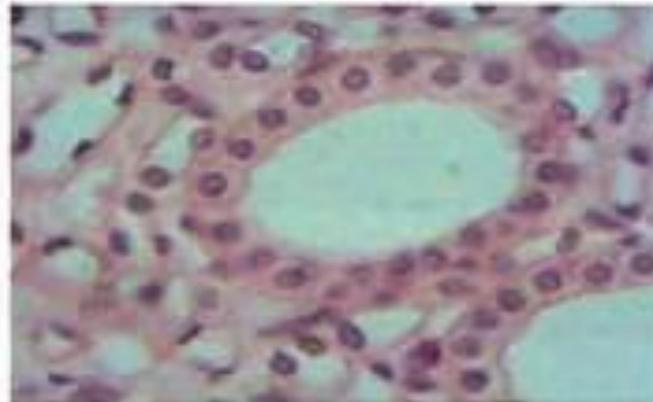
Nervous tissue

# TYPES OF TISSUES

## ○ **Epithelial tissue:**

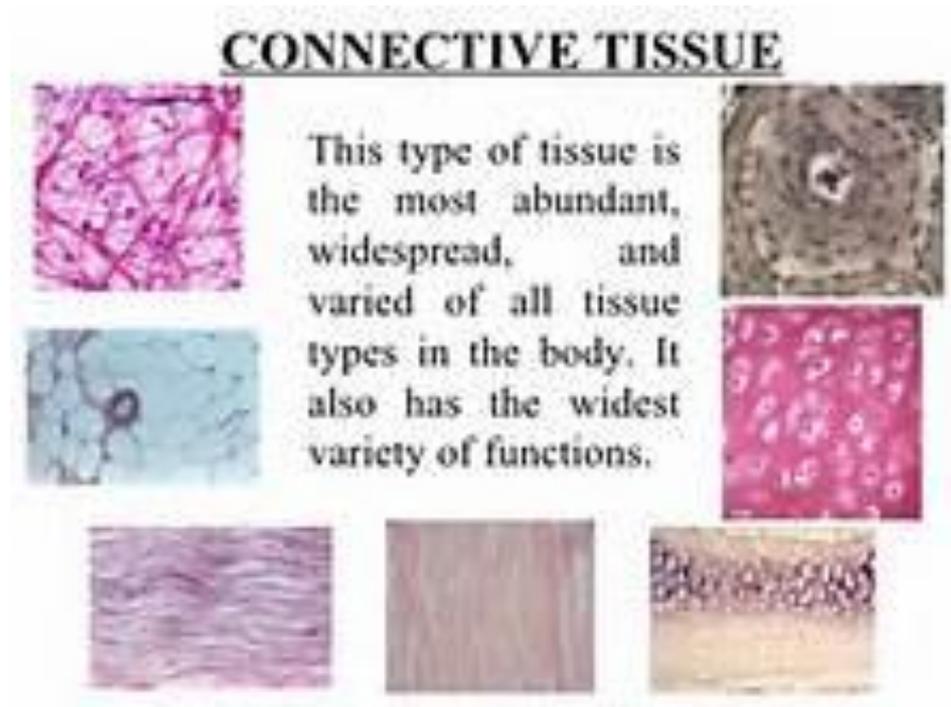
- covers the surface of the body and main tissue in skin
- forms lining of intestinal, respiratory, circulatory, & urinary tracts
- forms body glands where it specializes to produce secretions for the body like mucus & digestive juices

Epithelial Tissues



# TYPES OF TISSUES

- **Connective tissue** is the supporting fabric of organs and other body parts.
  - There are 2 types: soft and hard



# TYPES OF TISSUES

Soft connective tissue is divided into 2 types:  
**adipose & fibrous connective tissue**

- Adipose tissue (fatty tissue) stores fat as a food reserve or source of energy & acts as padding
- Fibrous connective tissue helps hold body structures together (ligaments & tendons)



# TYPES OF TISSUES

- Hard connective tissue includes **cartilage** and **bone**
  - Cartilage is a tough, elastic material found between the bones of the spine & at the ends of long bones. It acts as shock absorber and allows for flexibility. It is also found in the nose, ears, & larynx
  - Bone (osseous tissue) forms rigid structure of body



# TYPES OF TISSUES

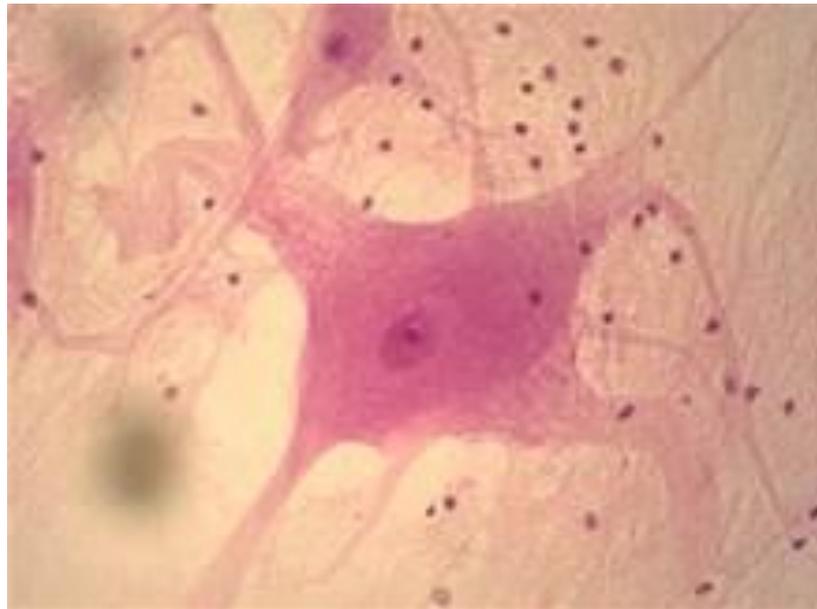
- There is also a class of connective tissue called **liquid connective tissue** (vascular tissue)
  - It includes blood and lymph - they transport substances in the body



# TYPES OF TISSUES

## ○ Nerve tissue

- controls and coordinates body activities by transmitting messages through the body
- Nerves, brain, & spinal cord are made of nerve tissue



# TYPES OF TISSUES

## ○ Muscle tissue

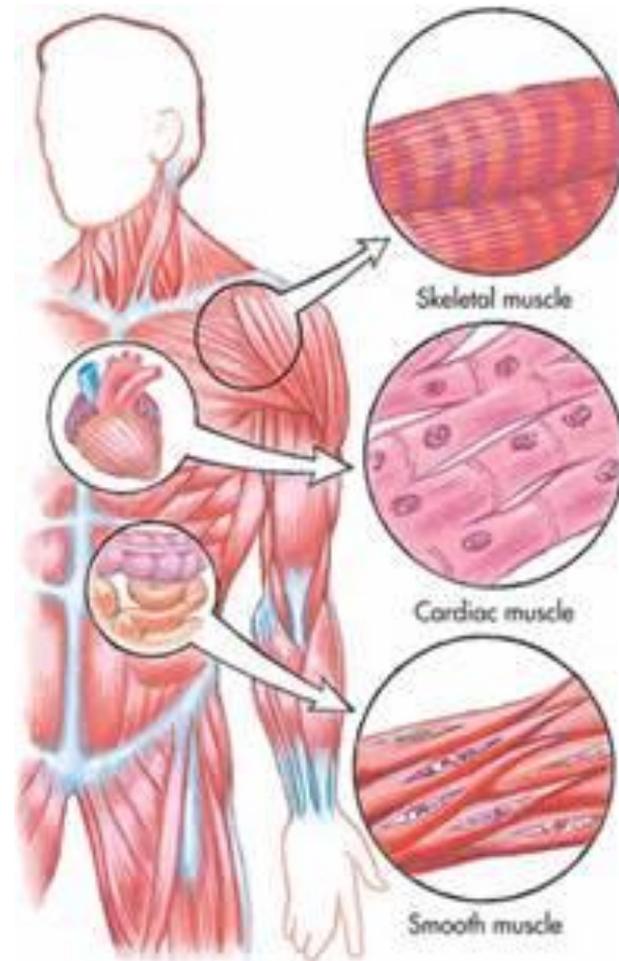
- produces power and movement by contraction of muscle fibers.
- There are 3 main kinds of muscle tissue: skeletal, cardiac, visceral/smooth



# TYPES OF TISSUES

## ○ Muscle tissue

- Skeletal which attaches to bones and provides movement
- Cardiac which causes heart to beat
- Visceral/smooth which is walls of respiratory, digestive, urinary tract, and blood vessels

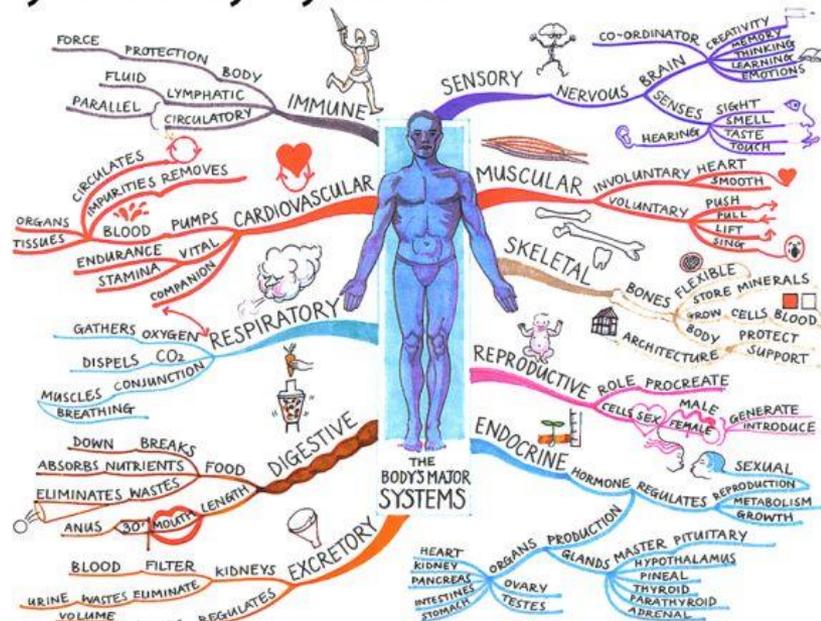


# ORGANS AND SYSTEMS

- ◉ Organs: two or more tissues joined together for a specific purpose
- ◉ Systems: organs and other body parts joined together for a particular function. There are 11 basic systems.

- Integumentary
- Skeletal
- Muscular
- Circulatory
- Lymphatic
- Nervous
- Respiratory
- Digestive
- Urinary
- Endocrine
- Reproductive

## Study of Body Systems





# 7:2 BODY

## PLANES/DIRECTIONS/CAVITIES

- **Anatomic position**-standing upright, facing forward, arms at the sides with palms facing forward

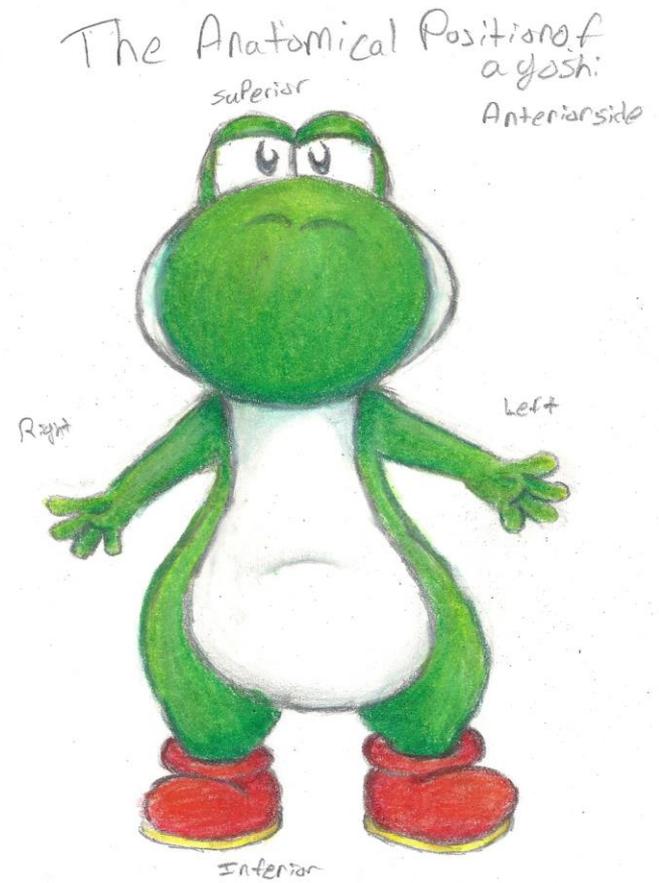


# 7:2 BODY

## PLANES/DIRECTIONS/CAVITIES

Body planes & directional terms were developed to describe the relationship of one part of the body to another (must be in anatomic position)

- **Body planes**: imaginary lines drawn through body at various levels to separate body into sections (3 main planes)
- **Directional terms** are created by planes (12 terms)

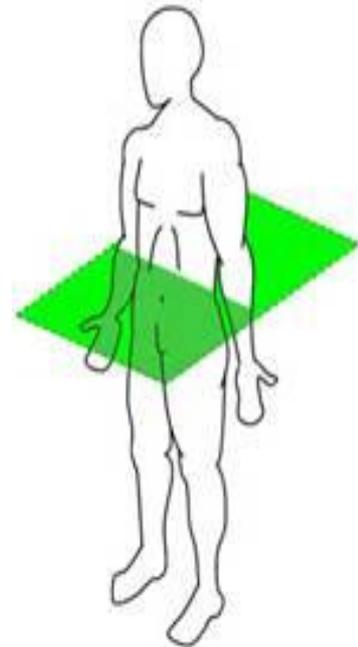


# 3 MAIN PLANES WITH 12 DIRECTIONAL TERMS

There are 3 main body planes: transverse, midsagittal, & frontal

1. **Transverse plane**: horizontal plane that divides the body into top and bottom halves.
  - Superior-top half (knee is superior to ankle)
  - Inferior-bottom half (knee is inferior to hip)
  - Cranial-towards the head
  - Caudal-towards the tail (sacral region of spinal column)

*TRANSVERSE*

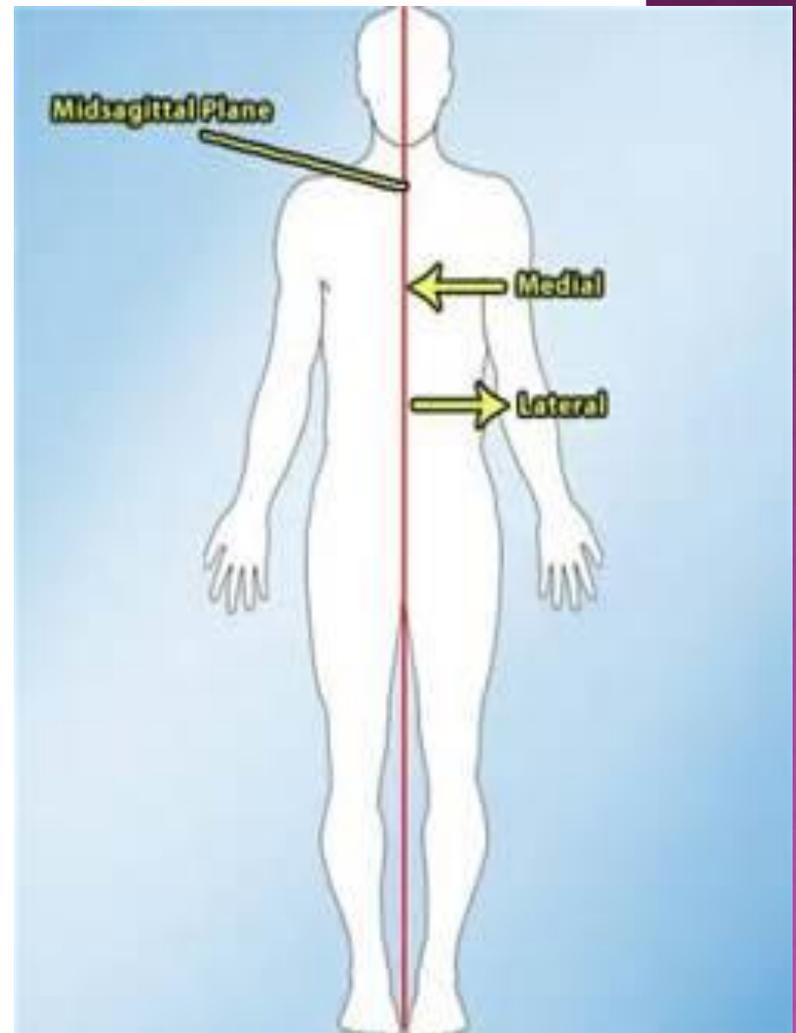


# 3 MAIN PLANES WITH 12 DIRECTIONAL TERMS

There are 3 main body planes: transverse, midsagittal, & frontal

2. **Midsagittal (median) plane**: vertical plane that divides body into left and right sides

- Medial-body parts close to the midline
- Lateral-body parts away from the midline

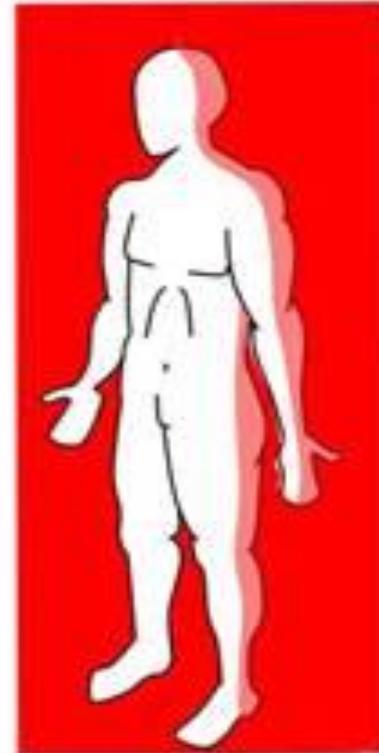


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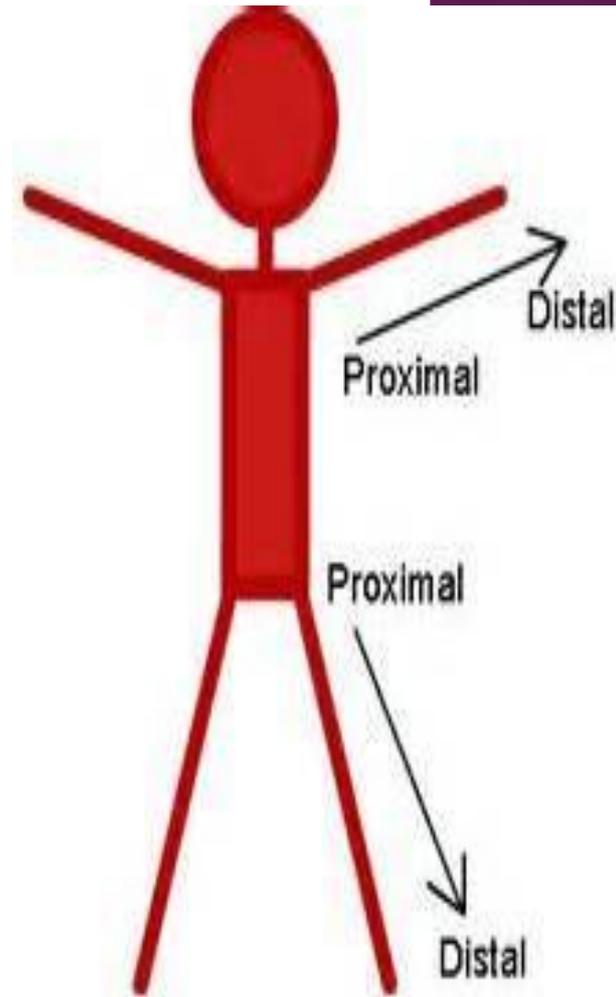
3. **Frontal (coronal) plane:** vertical plane divides the body into front and back sections
  - Ventral or Anterior-body parts on the front of the body
  - Dorsal or Posterior-body parts on the back of the body

***FRONTAL***

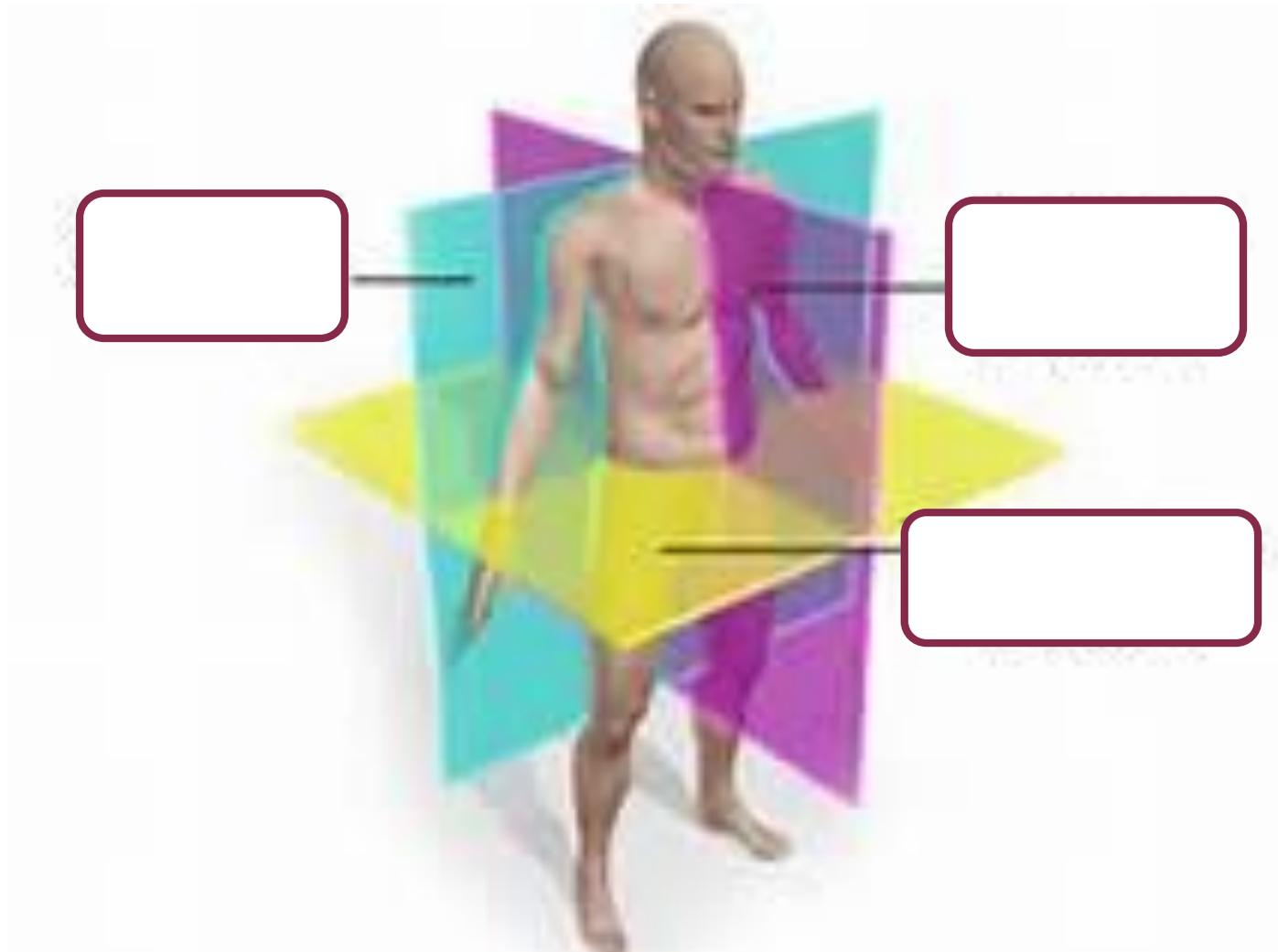


# 3 MAIN PLANES WITH 12 DIRECTIONAL TERMS

- Last 2 directional terms are **proximal & distal**.
- These are used to describe the location of the extremities (arms & legs) in relation to the main body trunk
- The main body trunk is called the point of reference
- **Proximal**-body parts close to the point of reference
- **Distal**-body parts distant from the point of reference



# CAN YOU LABEL THE PLANES?

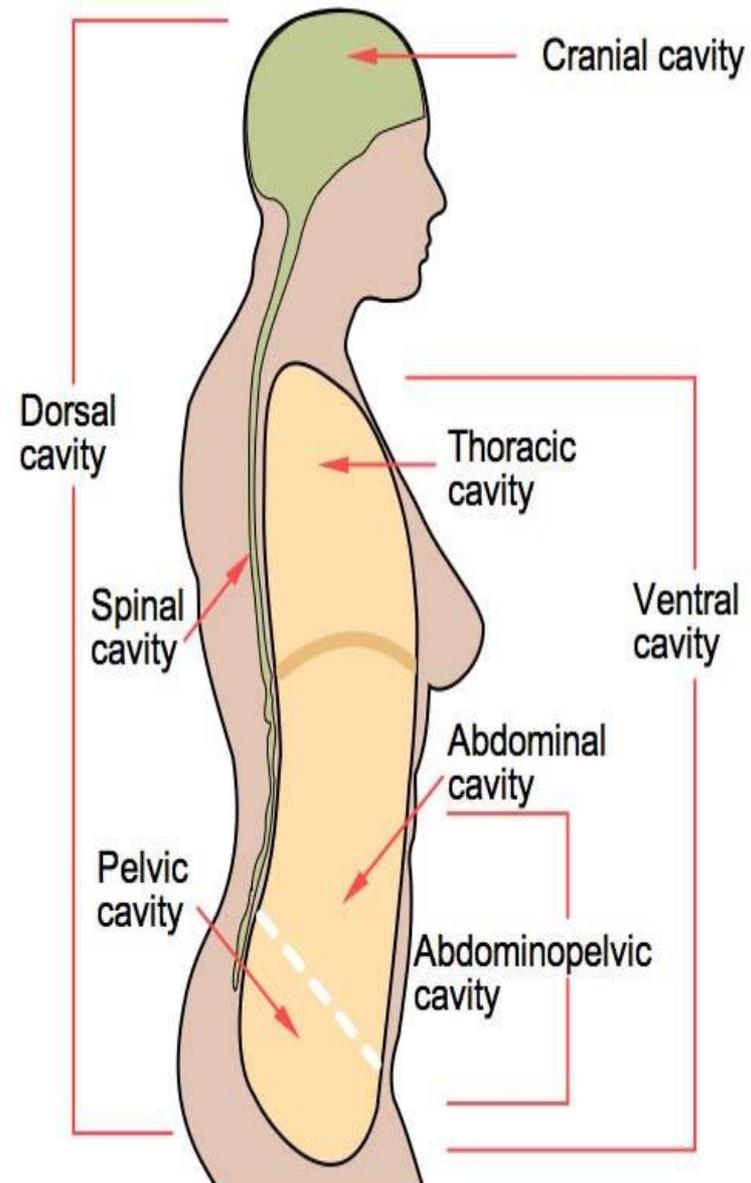


# BODY CAVITIES

- ◉ Body cavities: spaces within the body that contain vital organs
- ◉ There are 2 main cavities
  - Dorsal or posterior cavity
  - Ventral or anterior cavity
- ◉ And there are 3 small cavities
  - Orbital cavity-contains eyes
  - Nasal cavity-contains nose structures
  - Buccal cavity-(mouth)-teeth & tongue

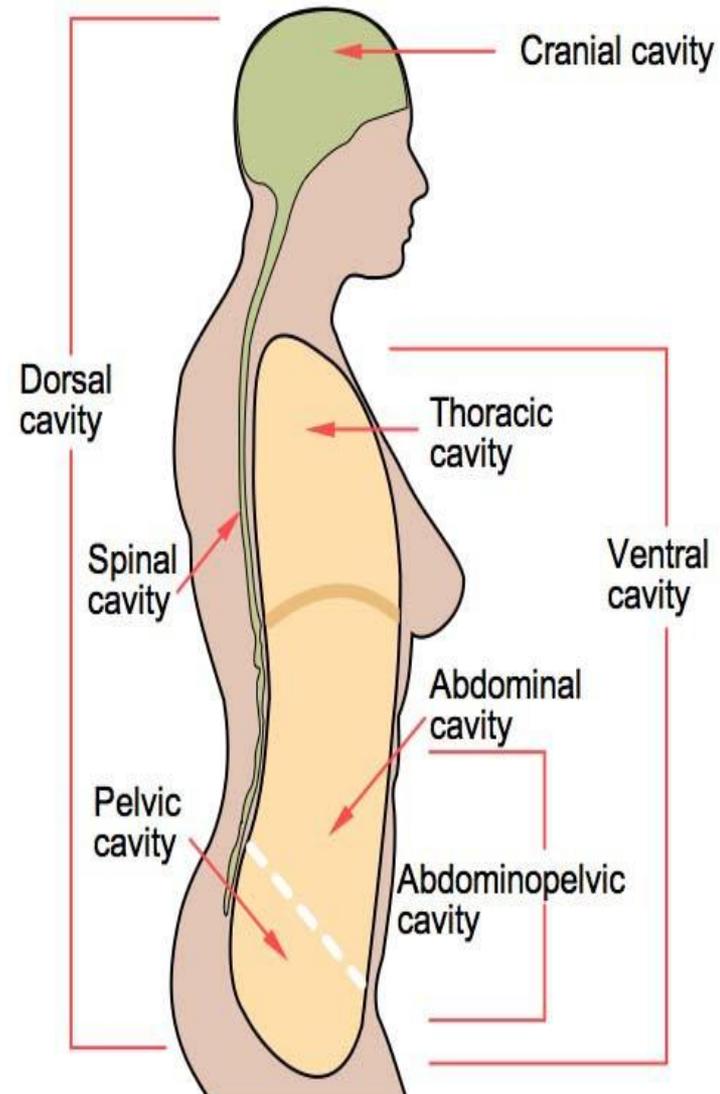
# THE MAIN CAVITIES

- **Dorsal cavity** is one long, continuous cavity on the back of the body
- It can be broken down into 2 sections: cranial cavity and spinal cavity
  - Cranial cavity holds the brain
  - Spinal cavity holds the spinal cord



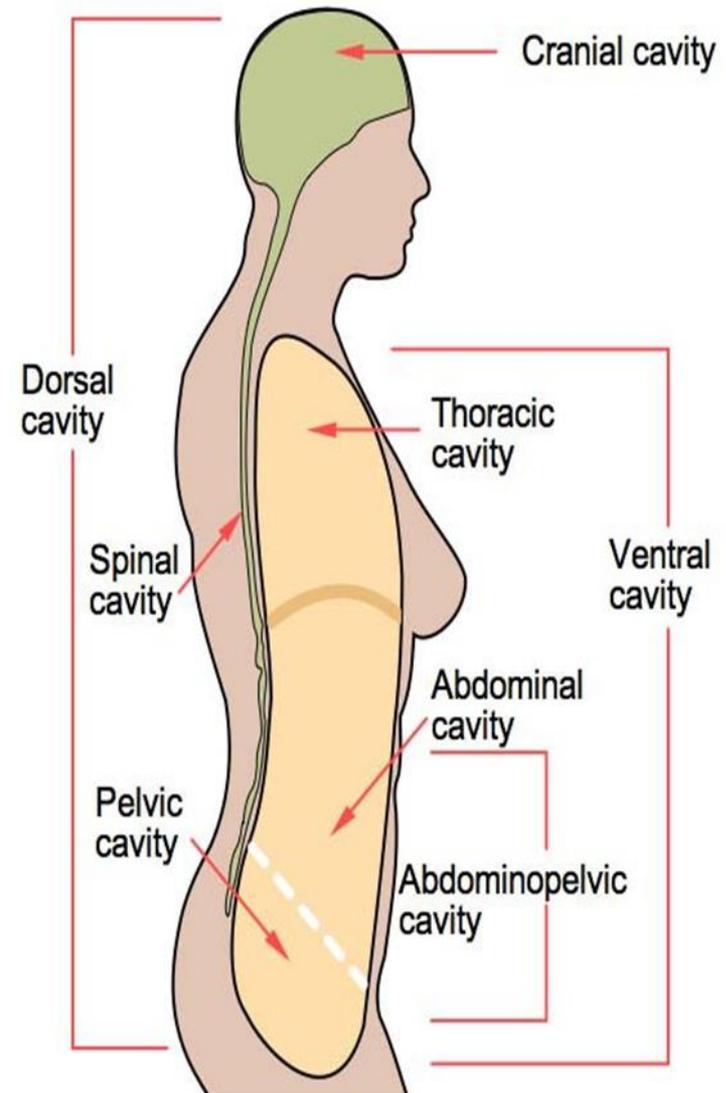
# THE MAIN CAVITIES

- **Ventral cavity** long cavity on the front of the body
- It is separated into 2 distinct cavities by the diaphragm muscle
  - Thoracic cavity is the upper cavity located in the chest and contains the esophagus, trachea, bronchi, lungs, heart, and large blood vessels
  - Abdominal cavity (abdominopelvic cavity) is the lower cavity below the diaphragm muscle



# THE MAIN CAVITIES

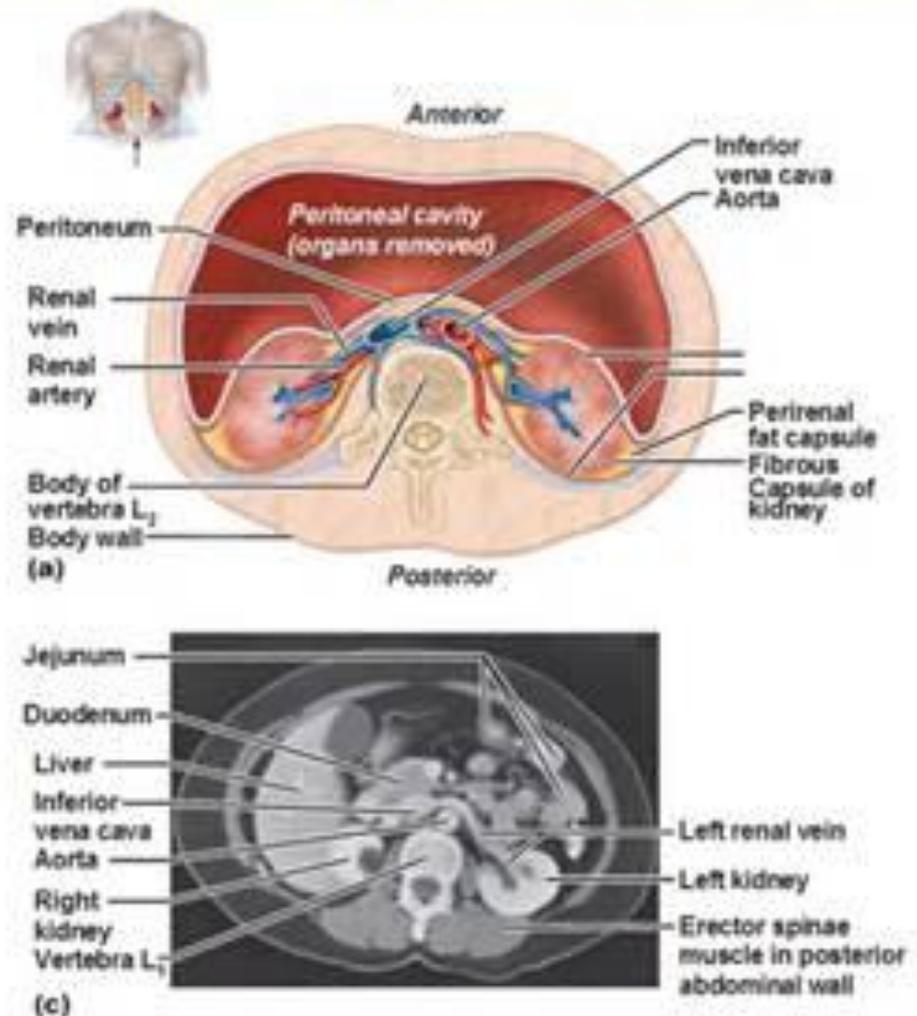
- Abdominal cavity is divided into an upper part and a lower part
  - Upper abdominal cavity contains the stomach and a large part of digestion system
  - Lower abdominal cavity (pelvic cavity) has the urinary bladder, reproductive organs, and last part of large intestine



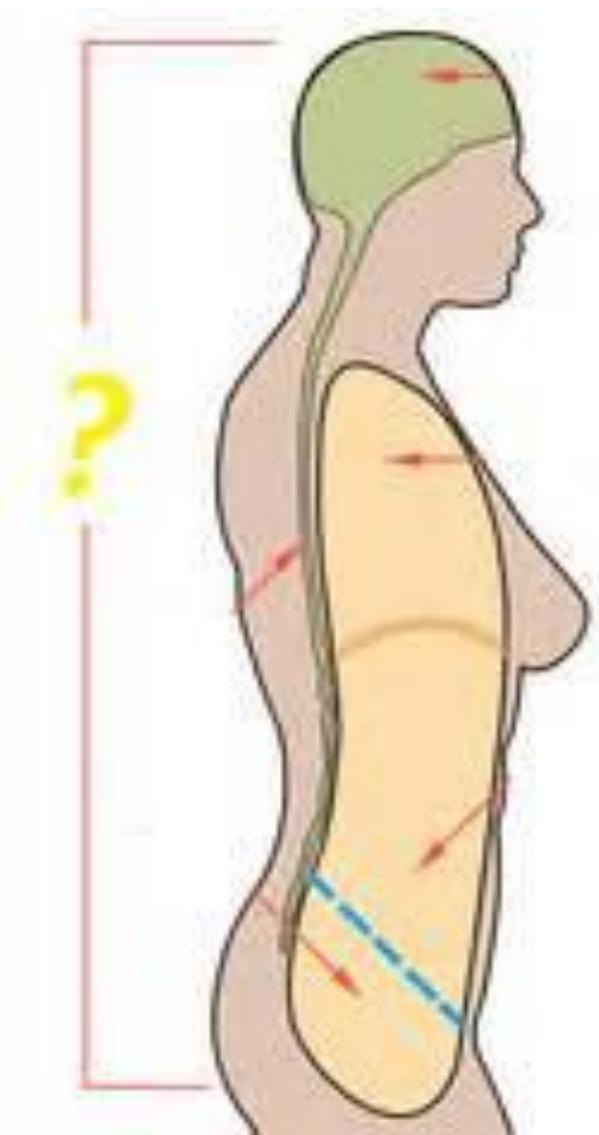
# THE MAIN CAVITIES

- The kidneys and the adrenal glands are located outside the abdominal cavity and behind the peritoneal membrane
- This area is called the retroperitoneal space

## Retroperitoneal Position of the Kidneys

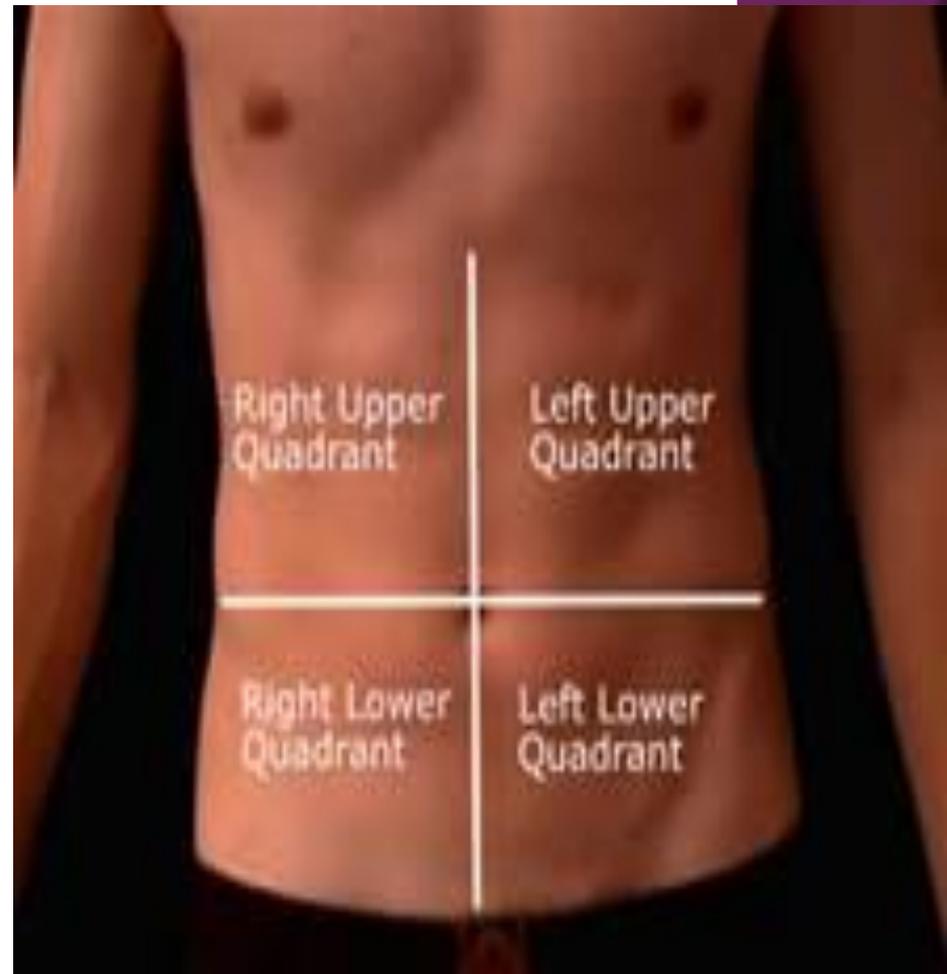


# CAN YOU LABEL THE CAVITIES?



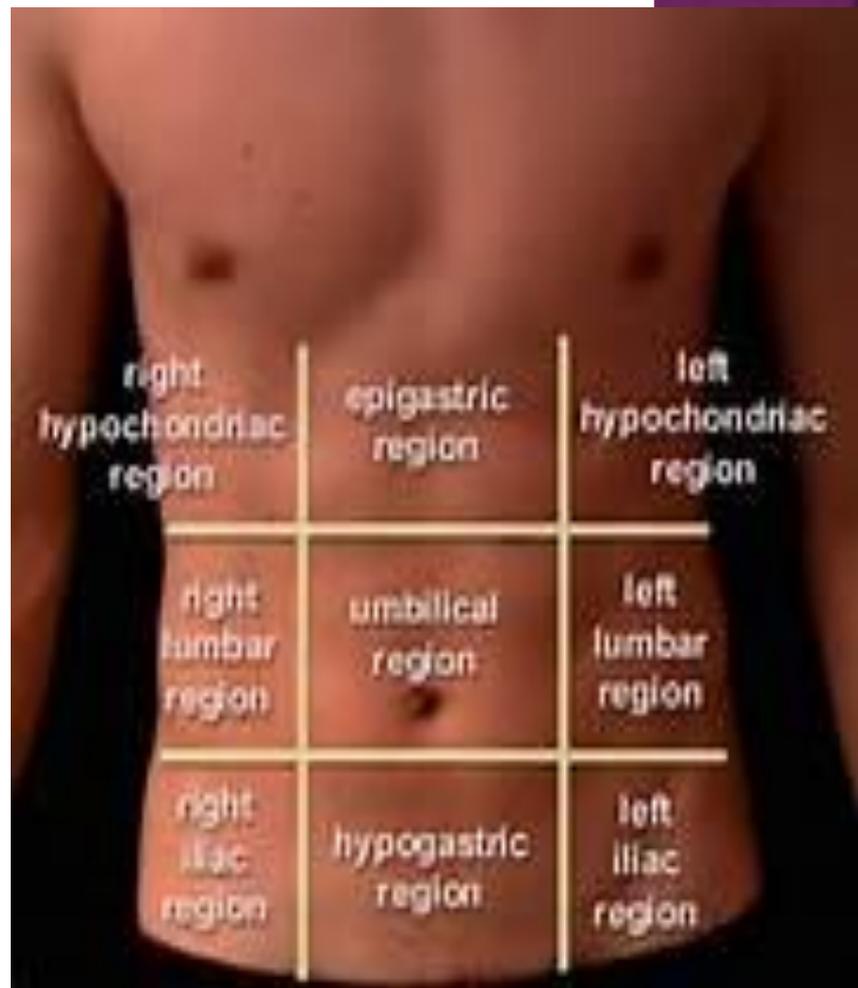
# ABDOMINAL REGIONS

- ◉ Abdominal cavity is separated into quadrants or regions because it is so large
- ◉ Quadrants divide the abdominal cavity into 4 sections:
  - RUQ-right upper quadrant
  - LUQ-left upper quadrant
  - RLQ-right lower quadrant
  - LLQ -left lower quadrant

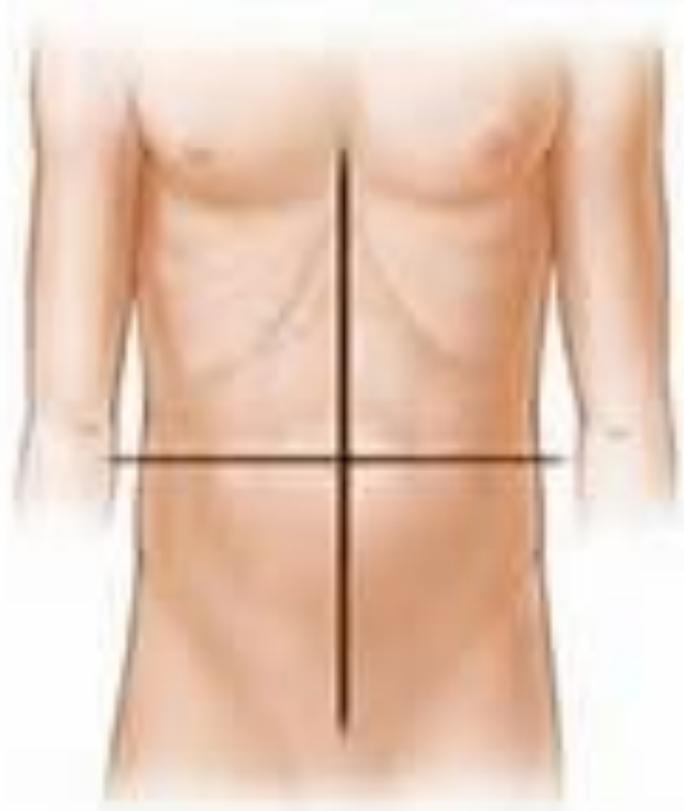


# ABDOMINAL REGIONS

- A more precise way of describing the abdominal cavity is with 9 regions, looking like a tic-tac-toe board.
  - Epigastric-center above stomach
  - Umbilical-center at navel
  - Hypogastric-center below stomach
  - Hypochondriac-sides below ribs (R & L)
  - Lumbar-sides and same as spinal column (R & L)
  - Iliac or inguinal-bottom near the groin (R & L)



# CAN YOU LABEL THE ABDOMINAL QUADRANTS?



# CAN YOU LABEL THE ABDOMINAL REGIONS?

