

BODY ORGANIZATION

HEALTH SCIENCE 1

DHO8, CH 7, 7.1 AND 7.2

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Part 1

Vocabulary and Cell Organization

7:1 BASIC STRUCTURE OF THE HUMAN BODY

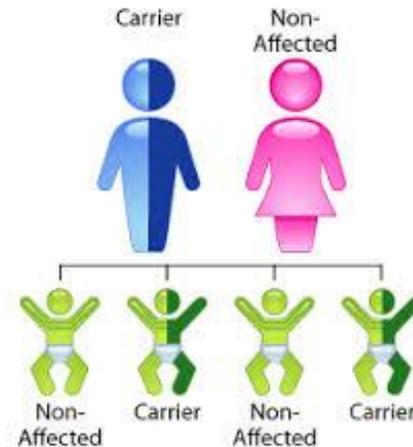
- The normal function of the human body is compared to an organized machine
- If the machine malfunctions, disease occurs
- Anatomy: study of form and structure
- Physiology: study of processes
- Pathophysiology: study of how disease occurs and body's response



7:1 BASIC STRUCTURE OF THE HUMAN BODY

Different types of diseases include:

- ◉ **Congenital**=acquired during development of the infant in the uterus (cleft lip, spina bifida)
- ◉ **Inherited**=transmitted from parents to child genetically (hemophilia, Down syndrome)



7:1 BASIC STRUCTURE OF THE HUMAN BODY

- ◉ **Infectious**=caused by a pathogenic organism such as a bacteria or virus (cold, STD)
- ◉ **Degenerative**=caused by deterioration of the function/structure of body tissues & organs either by normal aging or lifestyle choices (COPD, osteoarthritis)



Lumbar Degenerative Disc Disease



7:1 BASIC STRUCTURE OF THE HUMAN BODY

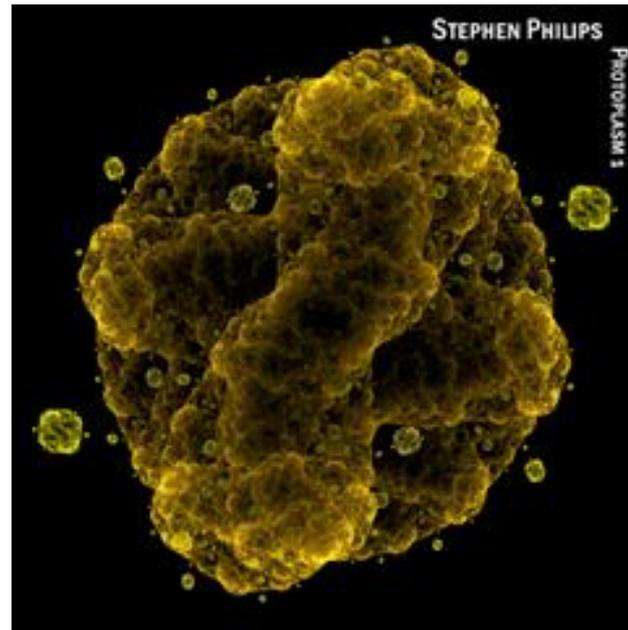
Other terms associated with disease:

- ◉ **Diagnosis**=identifying the disease or stating what it is
- ◉ **Etiology**=cause of the disease
- ◉ **Idiopathic**=unknown
- ◉ **Prognosis**=prediction of the probable course and/or the expected outcome of the disease



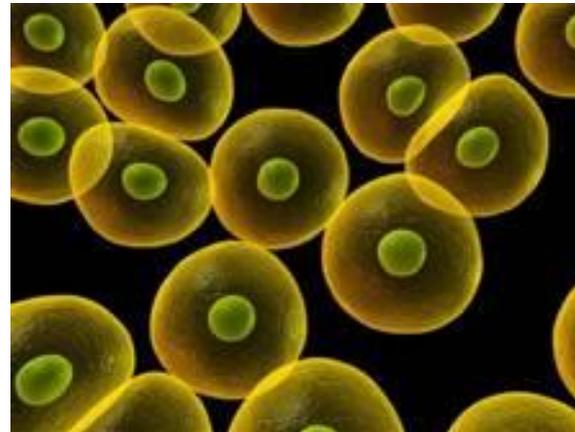
PROTOPLASM

- ⦿ 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

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Part 2

Tissues

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



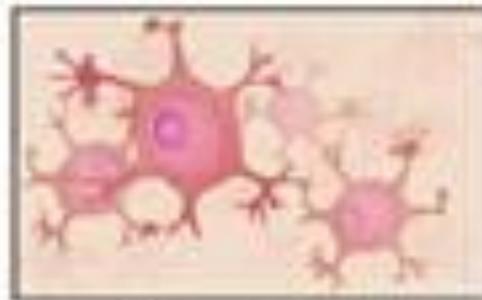
Connective tissue



Epithelial tissue



Muscle tissue



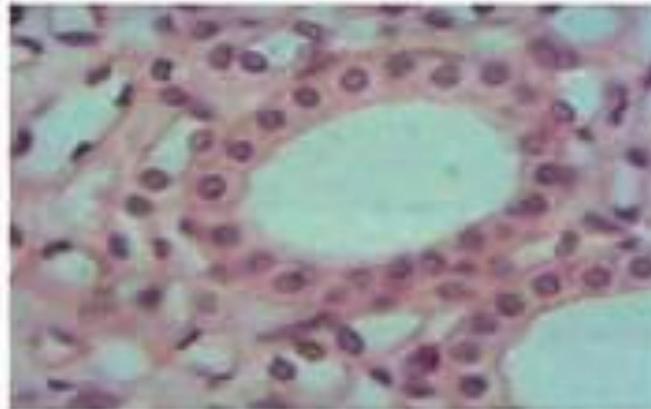
Nervous tissue

TYPES OF TISSUES

⦿ Epithelial tissue:

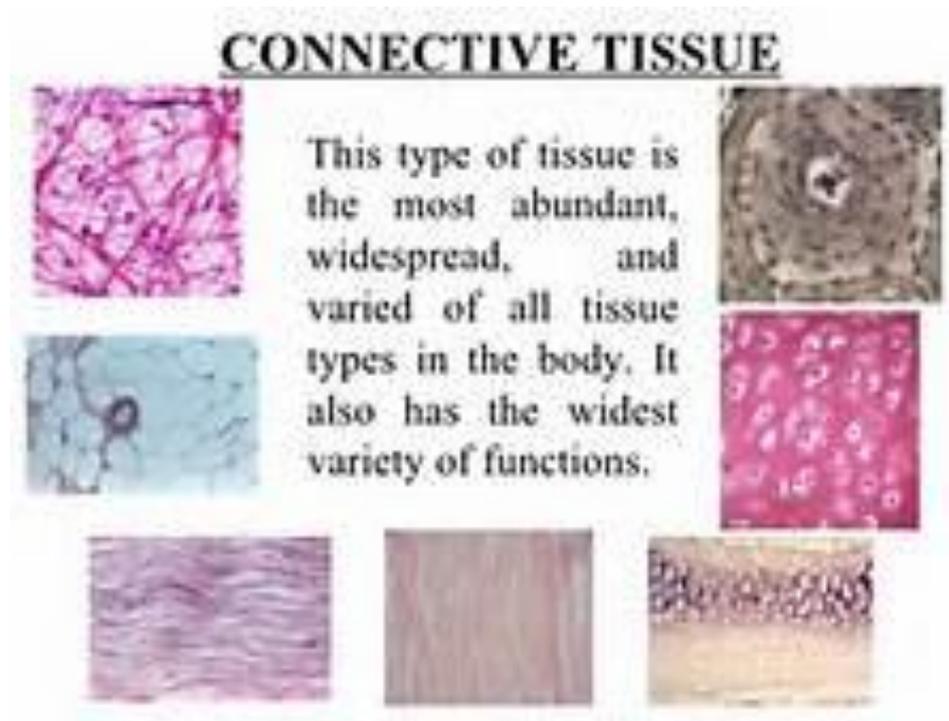
- covers the surface of the body and main tissue in skin
- forms lining of intestinal, respiratory, circulatory, & urinary tracts
- forms body glands where it specializes to produce secretions for the body like mucus & digestive juices

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

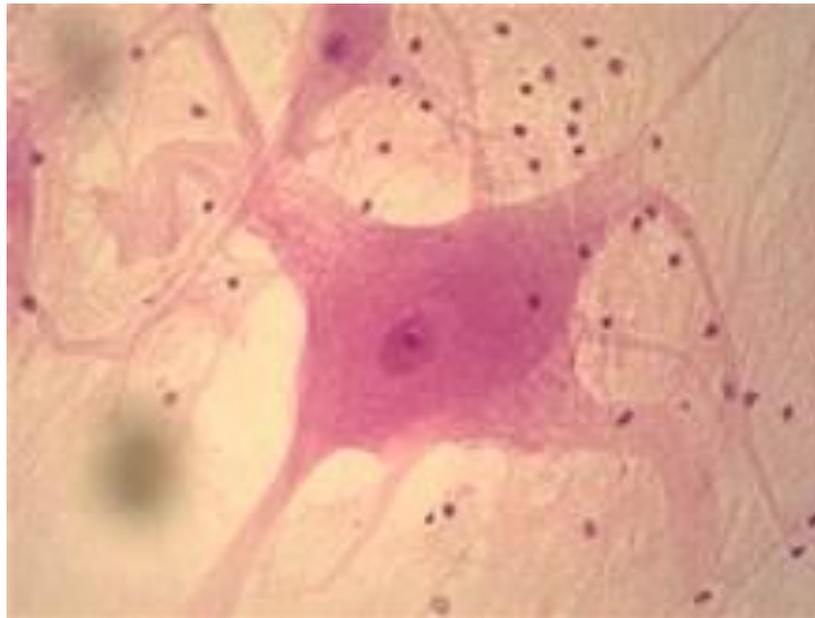
- There is also a class of connective tissue called **liquid connective tissue** (vascular tissue)
 - It includes blood and lymph - they transport substances in the body



TYPES OF TISSUES

○ Nerve tissue

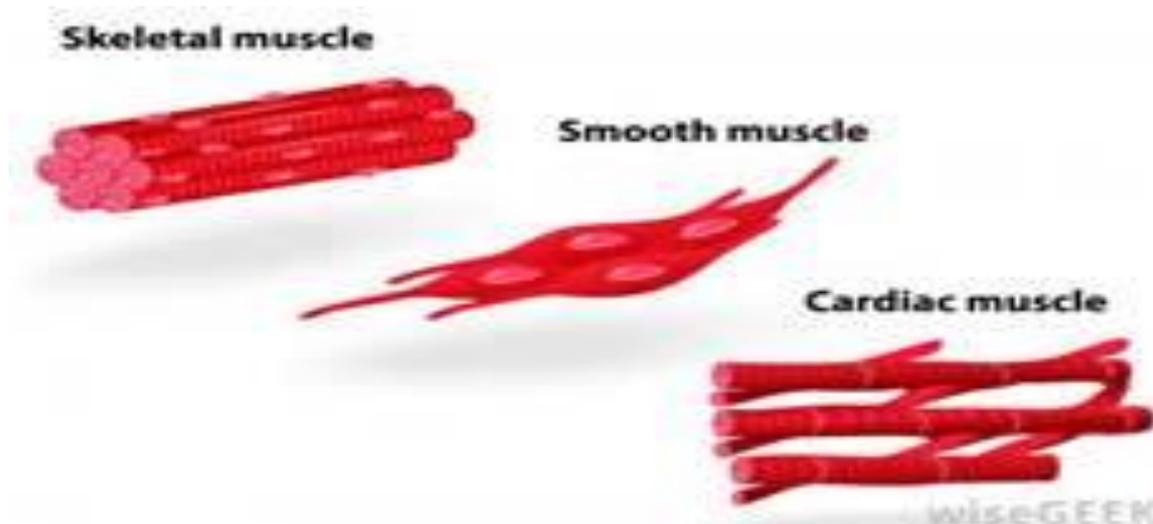
- controls and coordinates body activities by transmitting messages through the body
- Nerves, brain, & spinal cord are made of nerve tissue



TYPES OF TISSUES

○ Muscle tissue

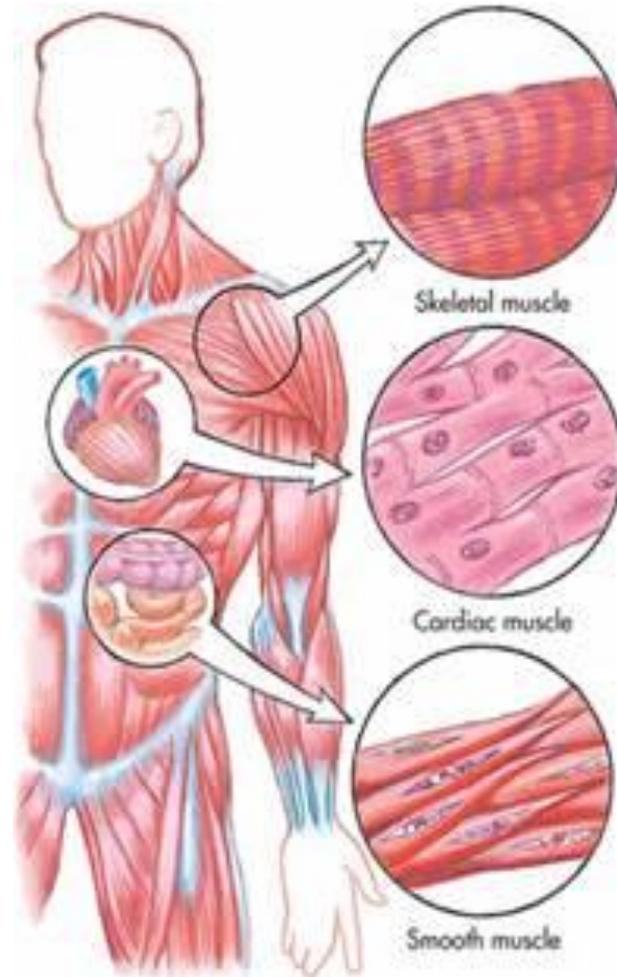
- produces power and movement by contraction of muscle fibers.
- There are 3 main kinds of muscle tissue: skeletal, cardiac, visceral/smooth



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



DO YOU KNOW?

◉ Which of the following is a type of muscle tissue?

- A) Smooth
- B) Squamous
- C) Osseous
- D) Carotid

And the answer is....A

DO YOU KNOW?

- ◉ Where would you find epithelial tissue?
 - A) Inside long bones
 - B) Inside the brain
 - C) Lining the inside of the nose
 - D) In the walls of the large intestine

And the answer is....C

DO YOU KNOW?

◉ What type of tissue transmits messages from the head to the toes?

A) Connective

B) Epithelial

C) Nerve

D) Muscle

And the answer is...C

DO YOU KNOW?

◉ What type of tissue is classified as hard or soft?

A) Epithelial

B) Muscle

C) Nervous

D) Connective

And the answer is...D

DO YOU KNOW?

- ◉ What is the primary function of muscle tissue?
 - A) To produce movement
 - B) To control and coordinate body activities
 - C) Transportation
 - D) To produce body secretions

And the answer is...A

DO YOU KNOW?

- ◉ Blood is classified as what type of tissue?
- A) Epithelial
- B) Connective
- C) Nerve
- D) Muscle

And the answer is...B

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Part 3

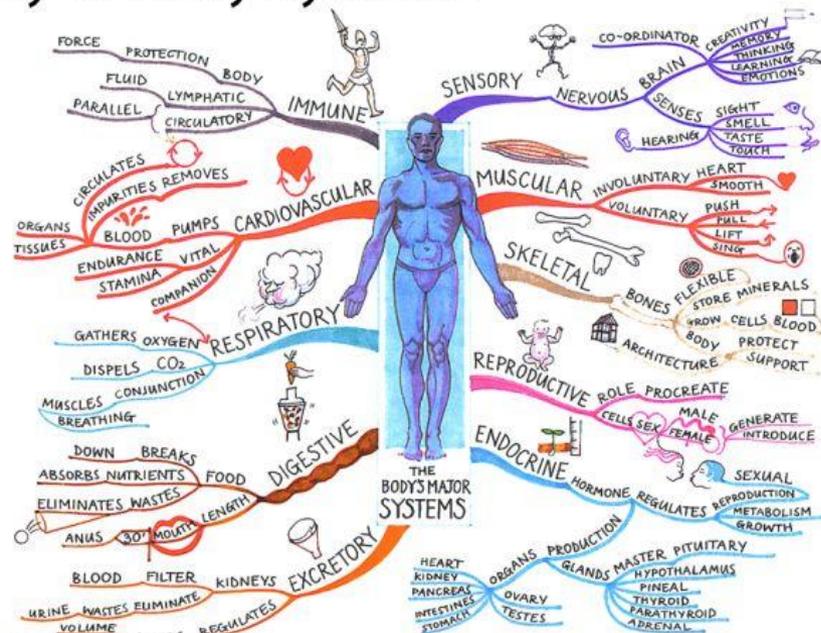
Organs & Systems

Planes & Directions

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



DO YOU KNOW?

- Of the following, which is the MOST complex?
 - A) Nucleus
 - B) Muscle tissue
 - C) Nerve cell
 - D) Kidney

And the answer is...D

DO YOU KNOW?

◉ Which organ or structure does NOT belong with the other three?

A) Stomach

B) Heart

C) Liver

D) Mouth

And the answer is...B

7:2 BODY

PLANES/DIRECTIONS/CAVITIES

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

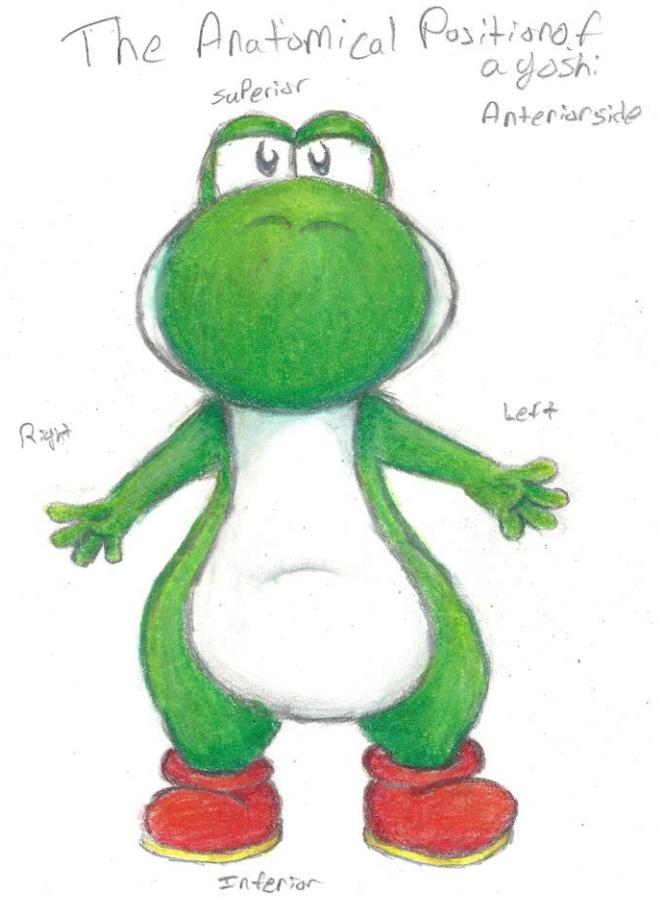


7:2 BODY

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)

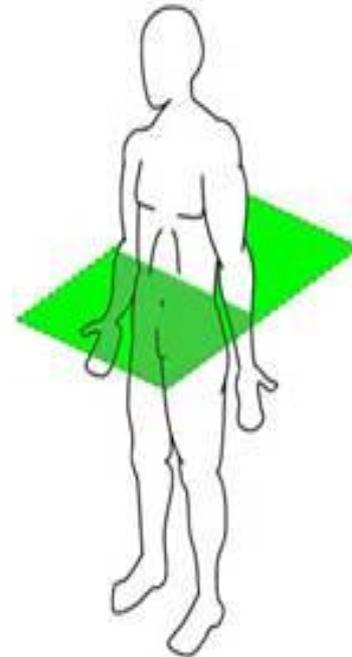


3 MAIN PLANES WITH 12 DIRECTIONAL TERMS

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

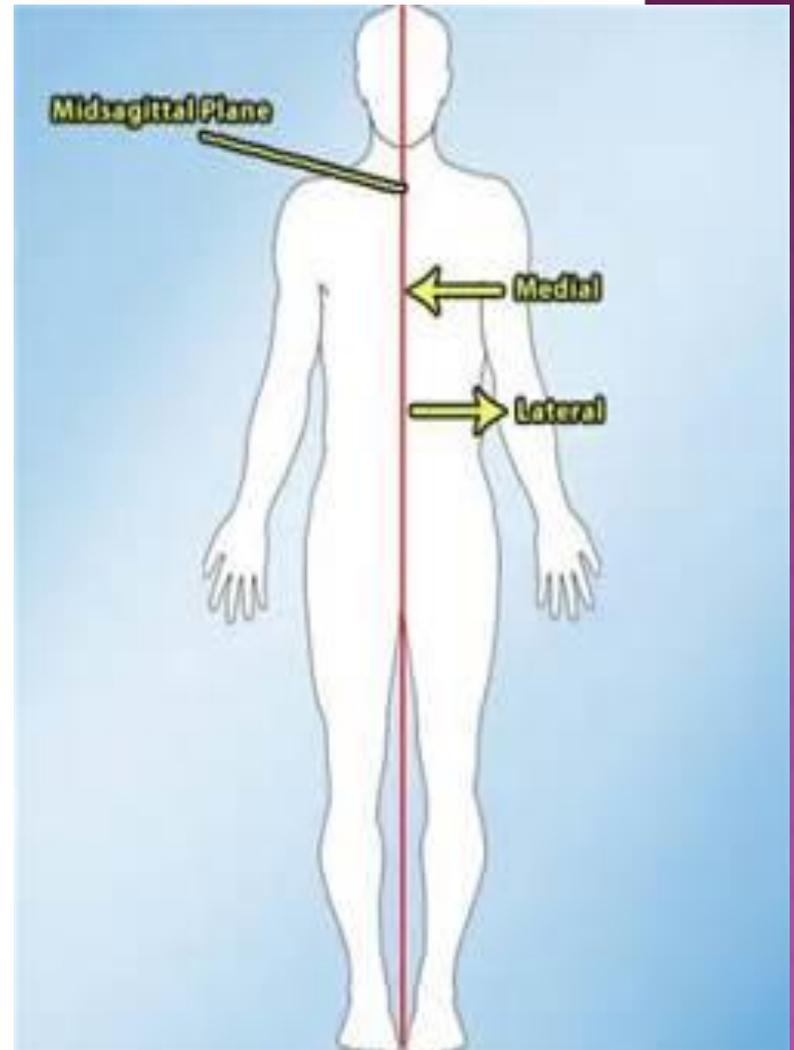


3 MAIN PLANES WITH 12 DIRECTIONAL TERMS

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



3 MAIN PLANES WITH 12 DIRECTIONAL TERMS

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

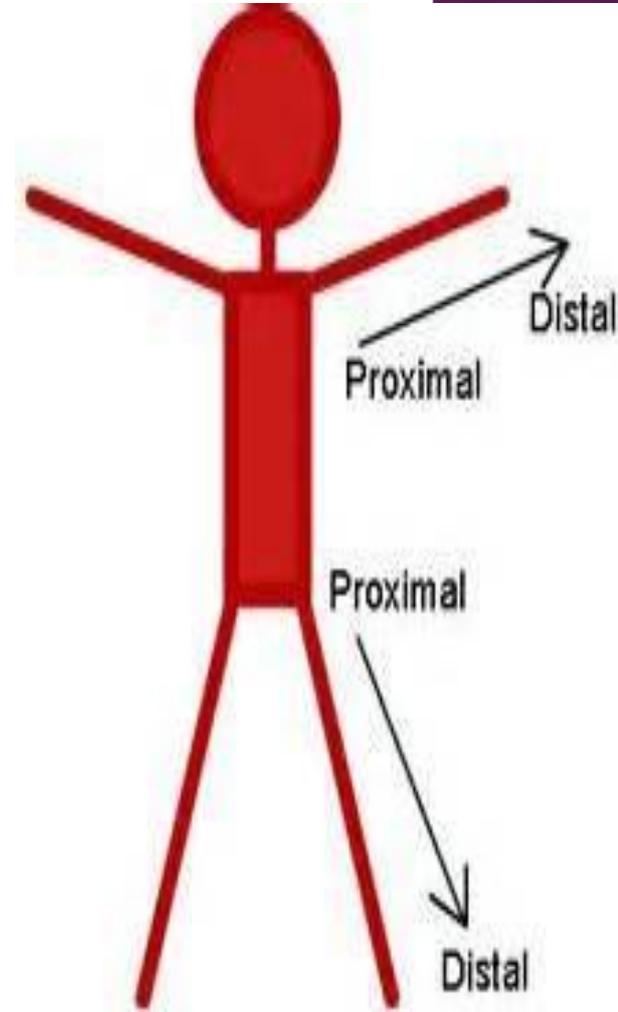
- Frontal (coronal) plane:** vertical plane divides the body into front and back sections
 - Ventral or Anterior-body parts on the front of the body
 - Dorsal or Posterior-body parts on the back of the body

FRONTAL

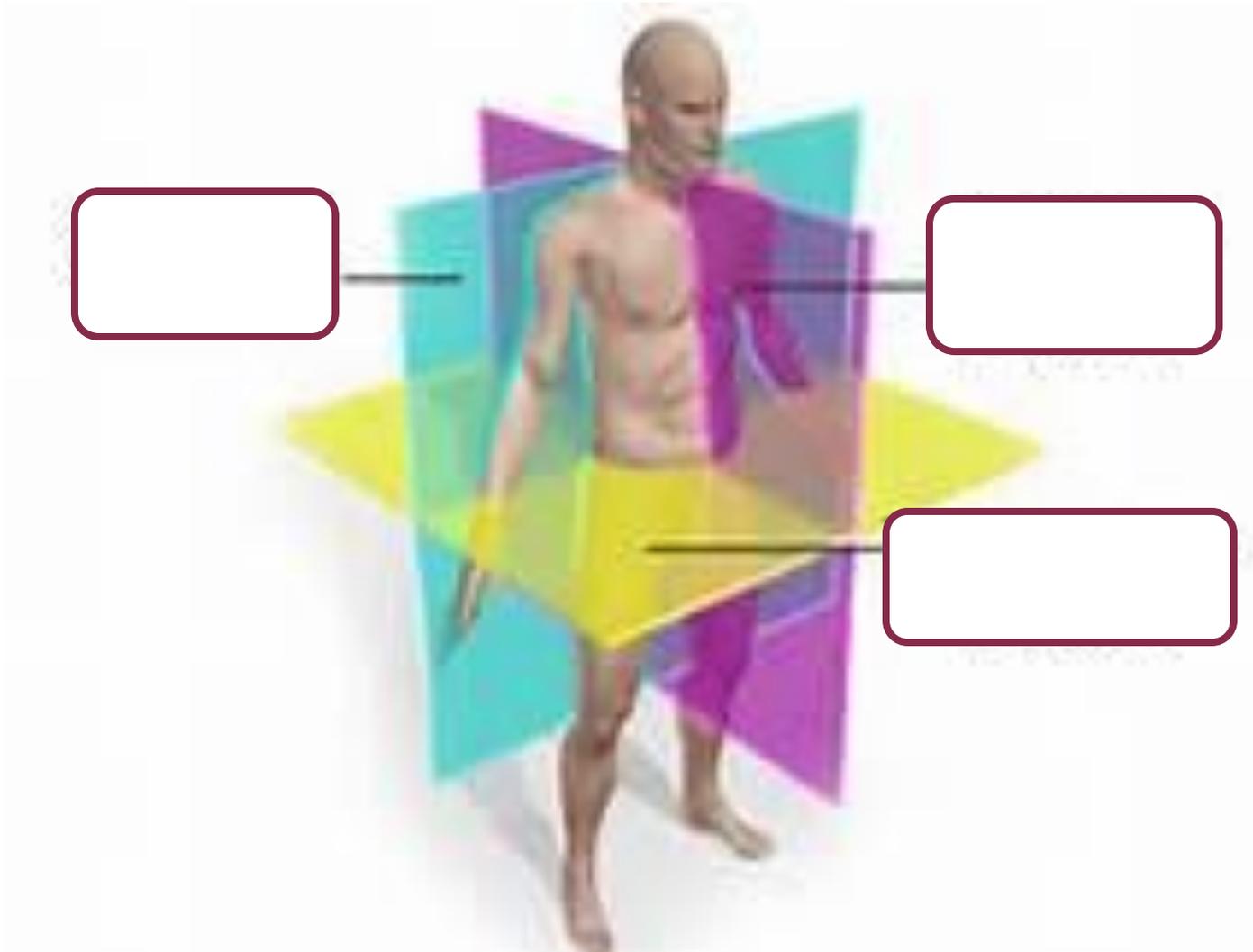


3 MAIN PLANES WITH 12 DIRECTIONAL TERMS

- 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?



DO YOU KNOW?

◉ If the body were cut in a transverse plane, what organ would NOT be in the same half as the other three?

- A) Brain
- B) Bladder
- C) Lungs
- D) Heart

And the answer is....B

DO YOU KNOW?

- ◉ What body part is inferior to the chest?

- A) Head
- B) Neck
- C) Heart
- D) Hips

And the answer is...D

DO YOU KNOW?

◉ If you divided the body with a midsagittal plane and added up the number of eyes, arms, and toes on one side, how many would you have?

- A) 5
- B) 7
- C) 9
- D) 12

And the answer is...B

DO YOU KNOW?

- ◉ An autopsy photo shows the dorsal side of the victim. What could you see in the photo?

- A) Back of the head
- B) Kidneys
- C) Knees
- D) Front of the abdomen

And the answer is...A

DO YOU KNOW?

○ Of the following, which structures are the most medial?

- A) Ears
- B) Hips
- C) Eyes
- D) Lips

And the answer is...D

DO YOU KNOW?

- ◉ What body parts are distal to the hand?

- A) Fingers
- B) Eyes
- C) Ribs
- D) Lungs

And the answer is...A

DO YOU KNOW?

- ◉ What structure is proximal to the thigh?

- A) Ankle
- B) Calf
- C) Knee
- D) Foot

And the answer is...C

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Part 4

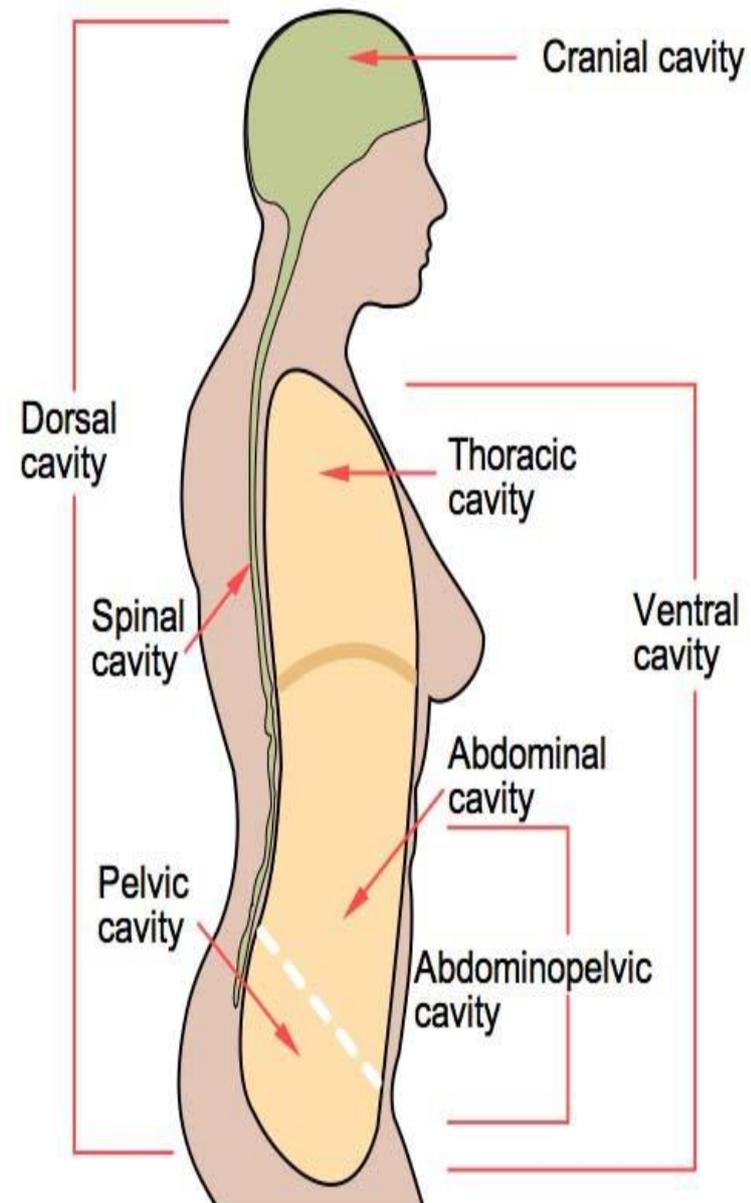
Body Cavities, Quadrants, & Regions

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

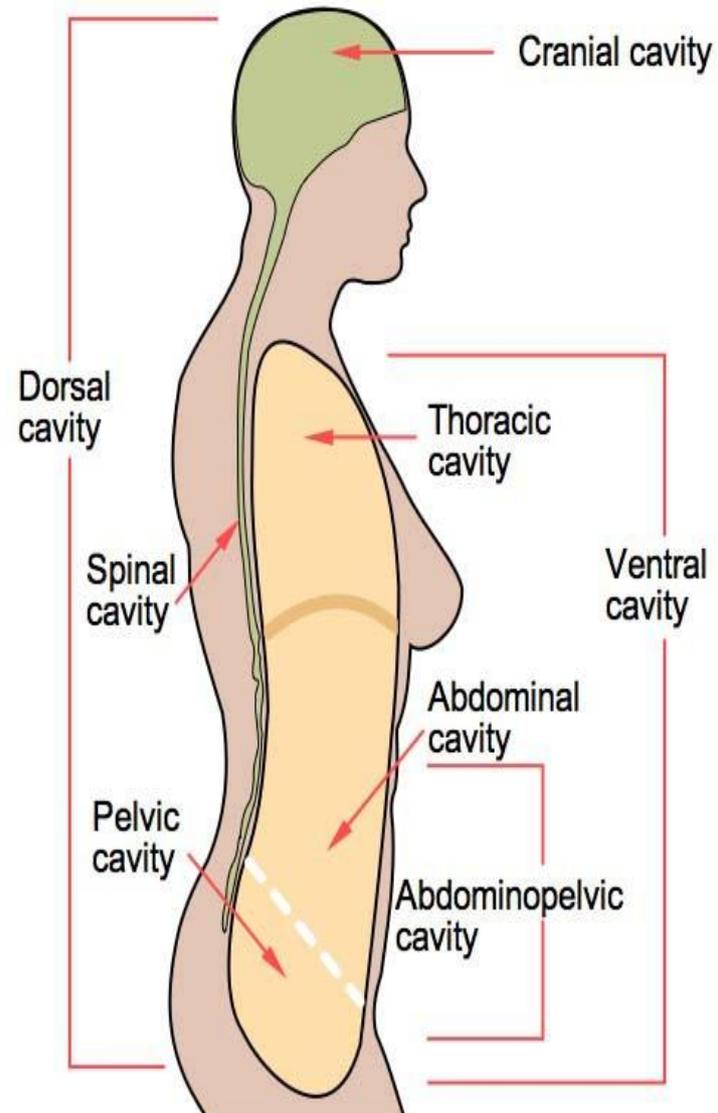
THE MAIN CAVITIES

- **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



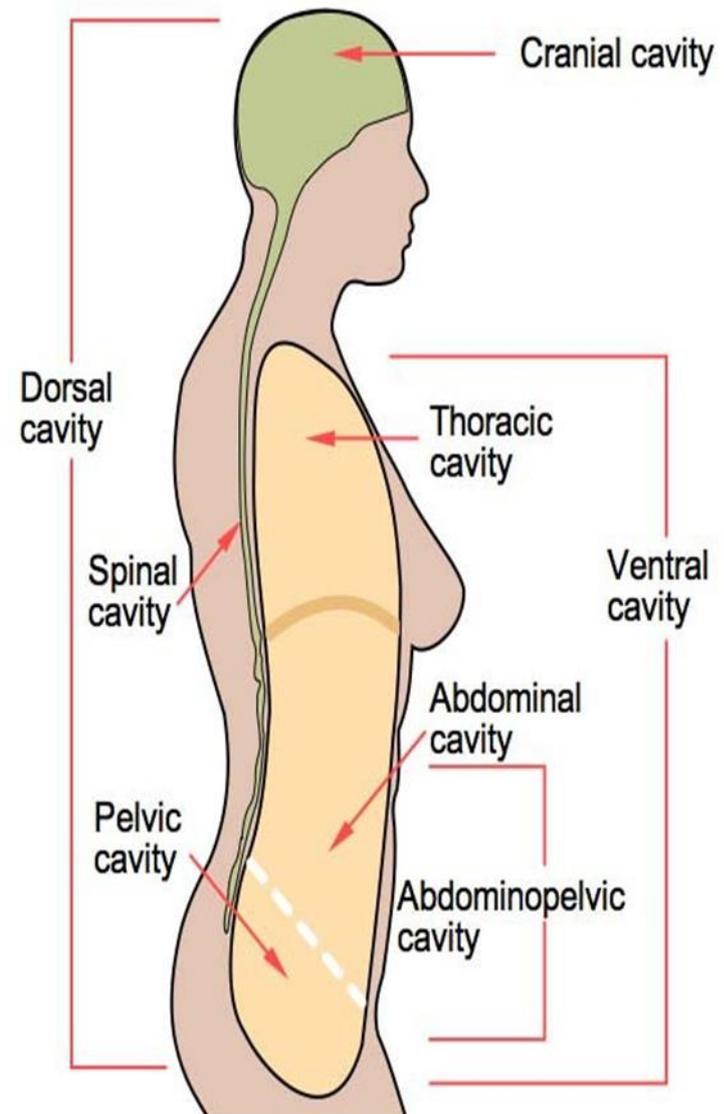
THE MAIN CAVITIES

- **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

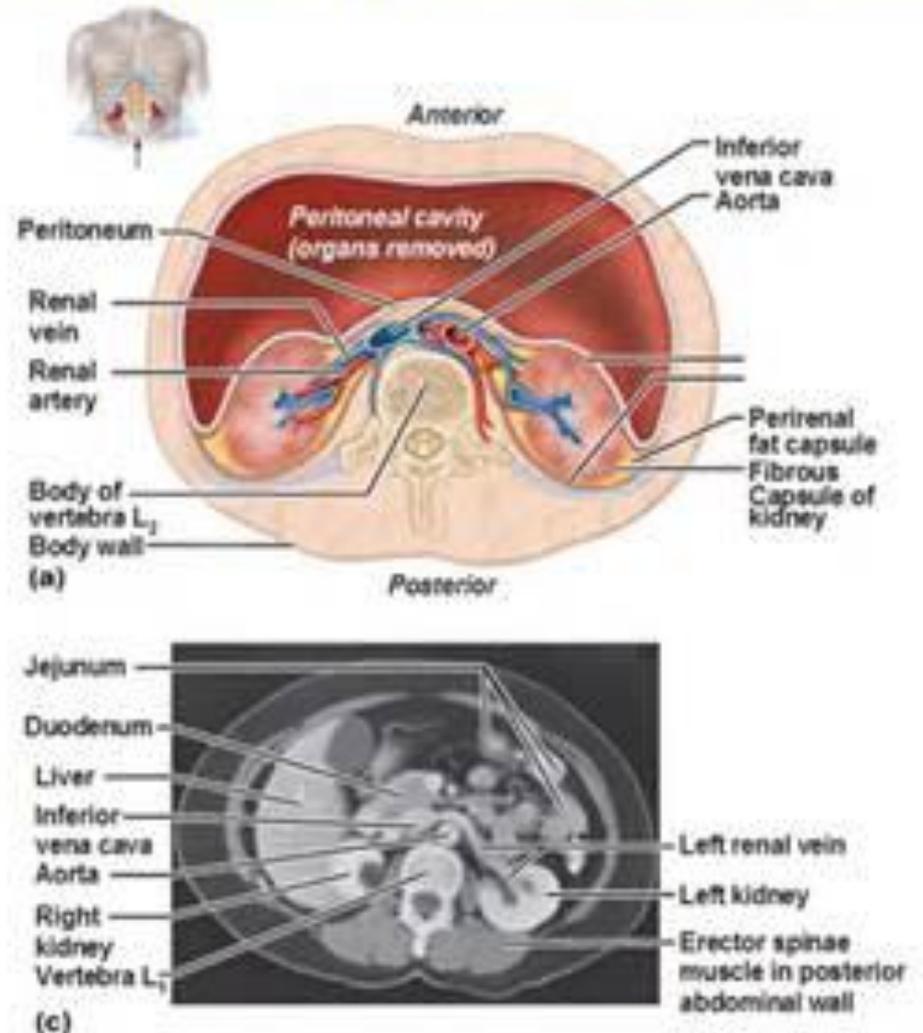
- Abdominal cavity is divided into an upper part and a lower part
 - Upper abdominal cavity contains the stomach and a large part of digestion system
 - Lower abdominal cavity (pelvic cavity) has the urinary bladder, reproductive organs, and last part of large intestine



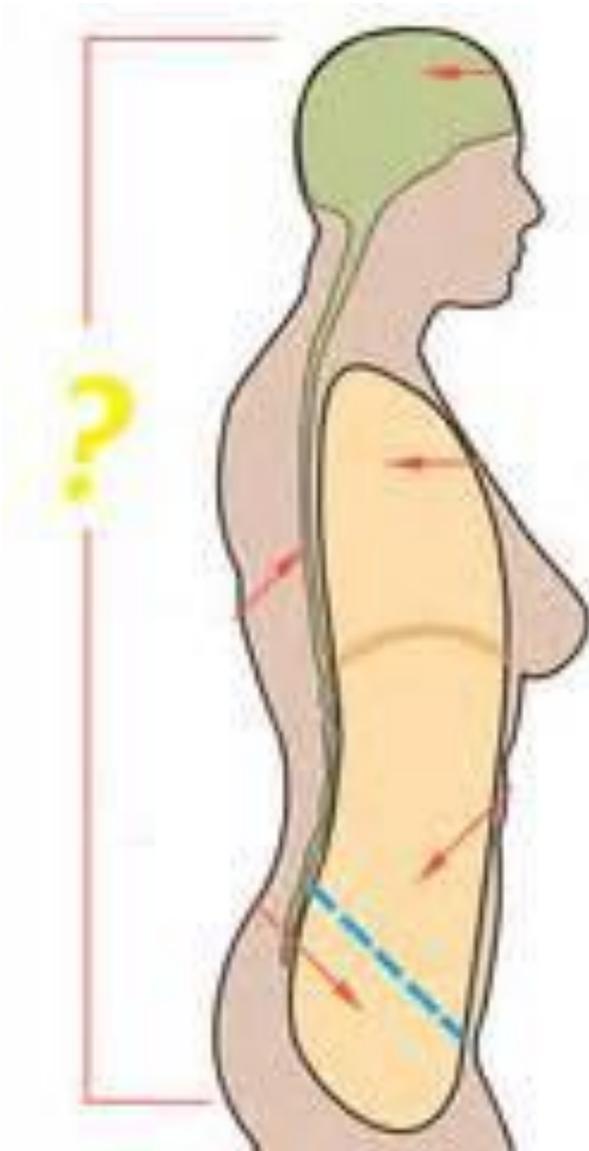
THE MAIN CAVITIES

- 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?



DO YOU KNOW?

- ◉ What structures are located anterior to the cranial cavity?

- A) Eyes
- B) Ears
- C) Lungs
- D) Neck muscles

And the answer is...A

DO YOU KNOW?

- ◉ What body cavity contains the brain and spinal cord?

- A) Cranial
- B) Spinal
- C) Dorsal
- D) Ventral

And the answer is...C

DO YOU KNOW?

- ◉ What cavity would a surgeon enter to repair a heart defect?

- A) Dorsal
- B) Thoracic
- C) Abdominal
- D) Pelvic

And the answer is...B

DO YOU KNOW?

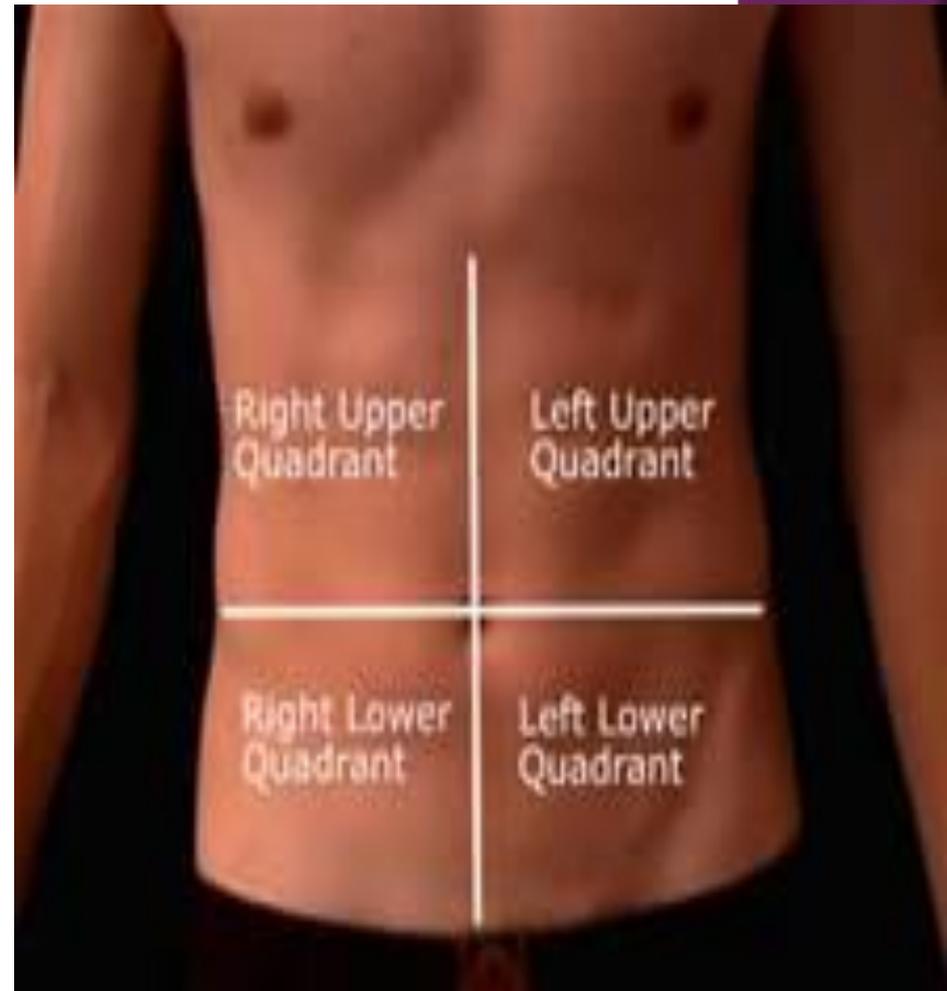
- ◉ If a physician performs a pelvic exam, what organs can be evaluated?

- A) Respiratory
- B) Reproductive
- C) Esophagus and stomach
- D) Liver and gallbladder

And the answer is...B

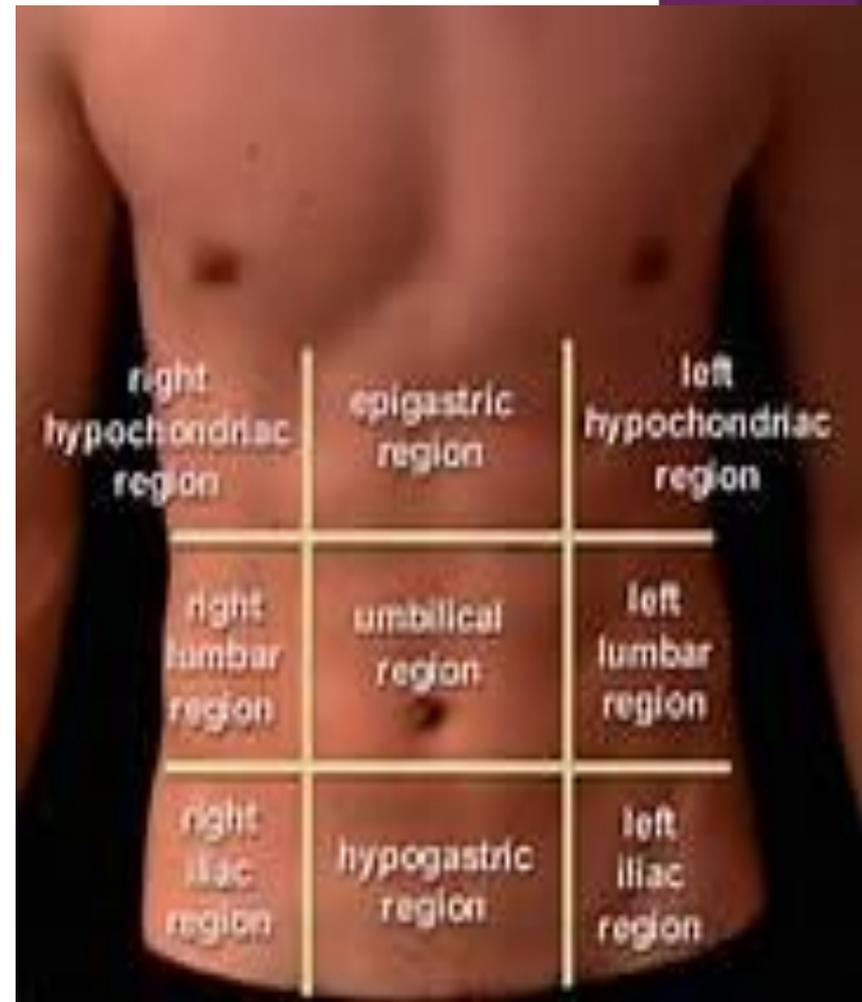
ABDOMINAL REGIONS

- ◉ 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

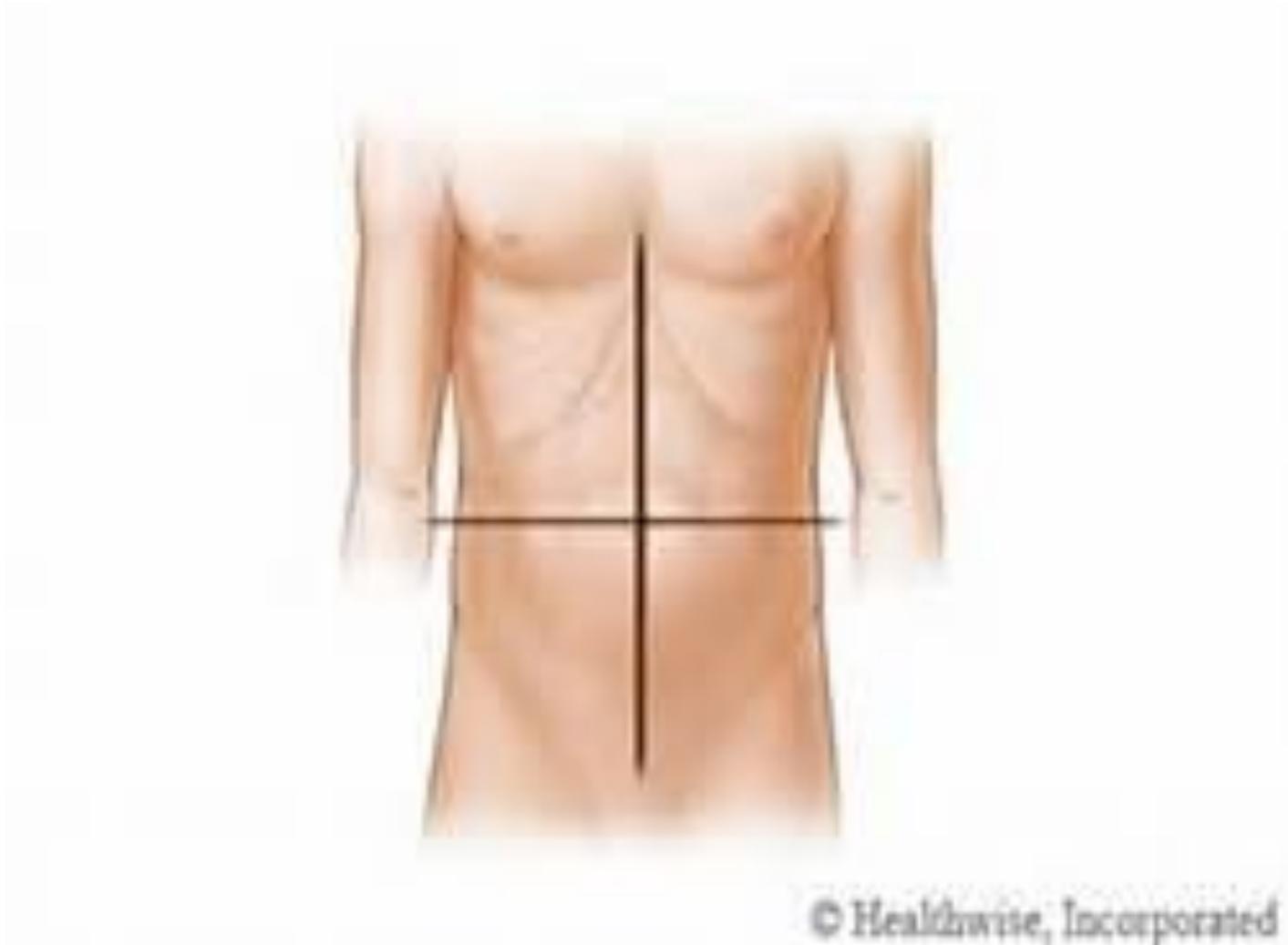


ABDOMINAL REGIONS

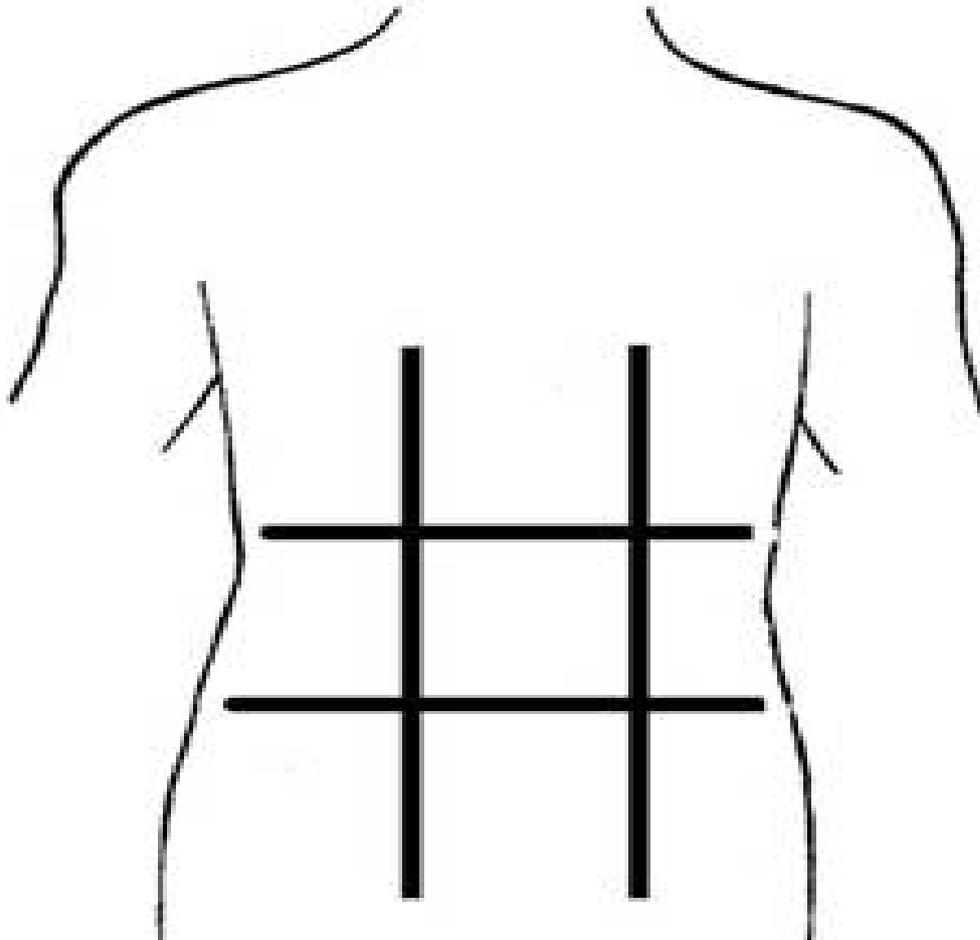
- A more precise way of describing the abdominal cavity is with 9 regions, looking like a tic-tac-toe board.
 - Epigastric-center above stomach
 - Umbilical-center at navel
 - Hypogastric-center below stomach
 - Hypochondriac-sides below ribs (R & L)
 - Lumbar-sides and same as spinal column (R & L)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



CAN YOU LABEL THE ABDOMINAL QUADRANTS?



CAN YOU LABEL THE ABDOMINAL REGIONS?



DO YOU KNOW?

- ◉ If a physician writes that the patient has RUQ pain, what might be causing it?
 - A) Head injury
 - B) Arthritis in the hip
 - C) Cracked rib
 - D) Dislocated shoulder

And the answer is...C