

Chapter 1

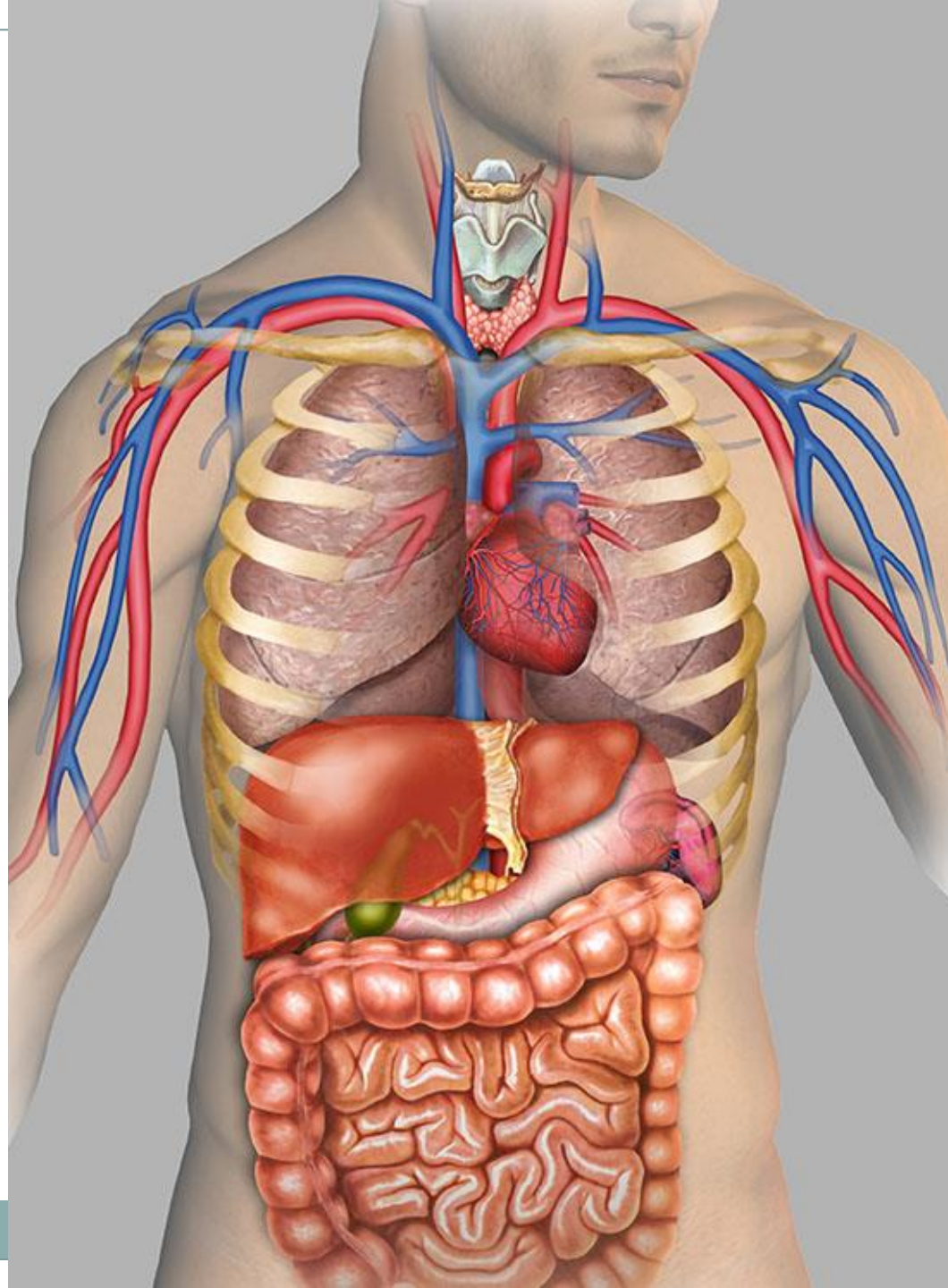
1

HUMAN BODY: AN ORIENTATION

Anatomy

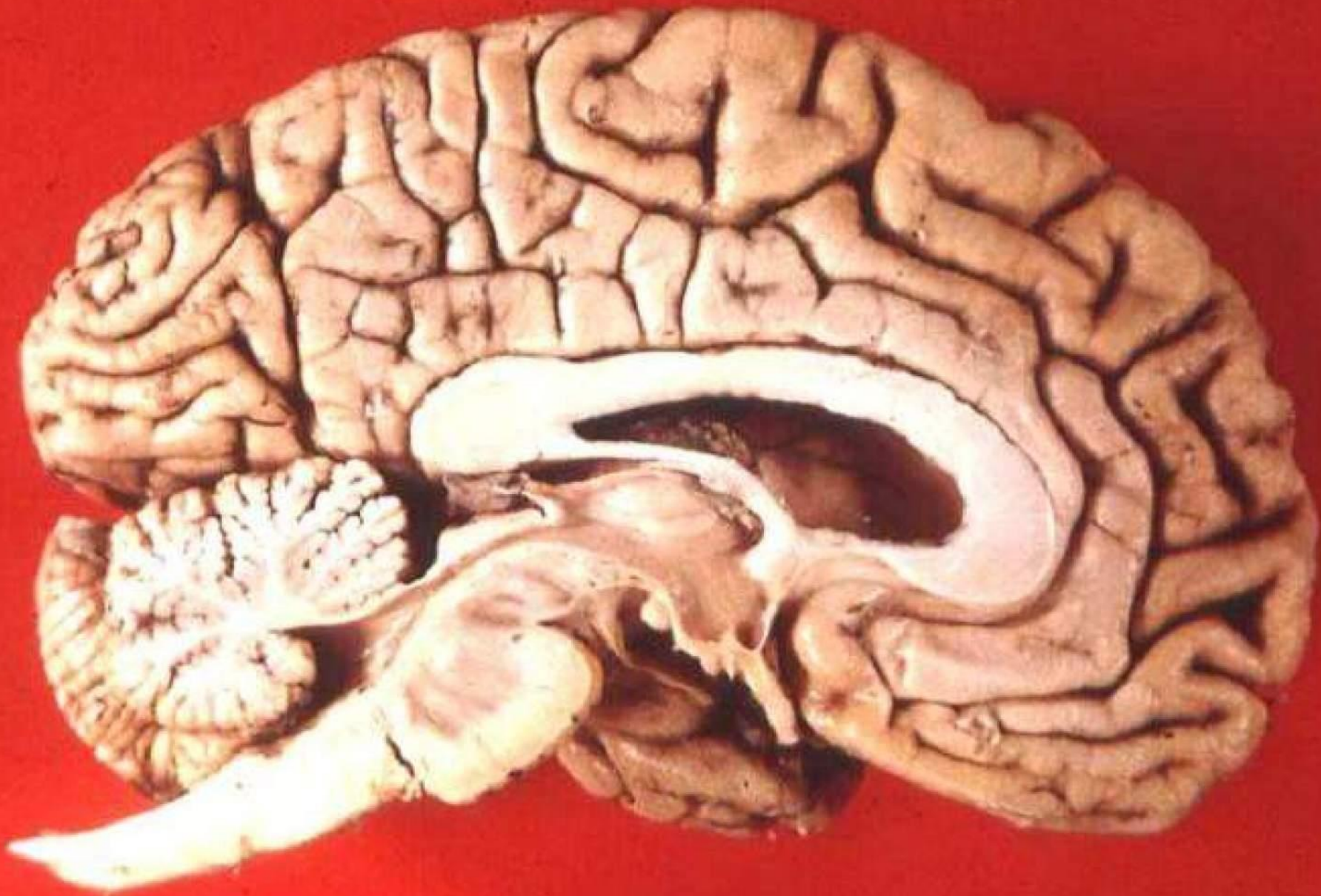
2

- The study of the structure and shape of the body and body parts and their relationships to one another.
- Is static and can be studied on dead specimens during a dissection.
- Uses directional and observational terms to describe what is seen.
- Measures shapes, sizes and weights.
- Ex. Structure of the brain or heart.



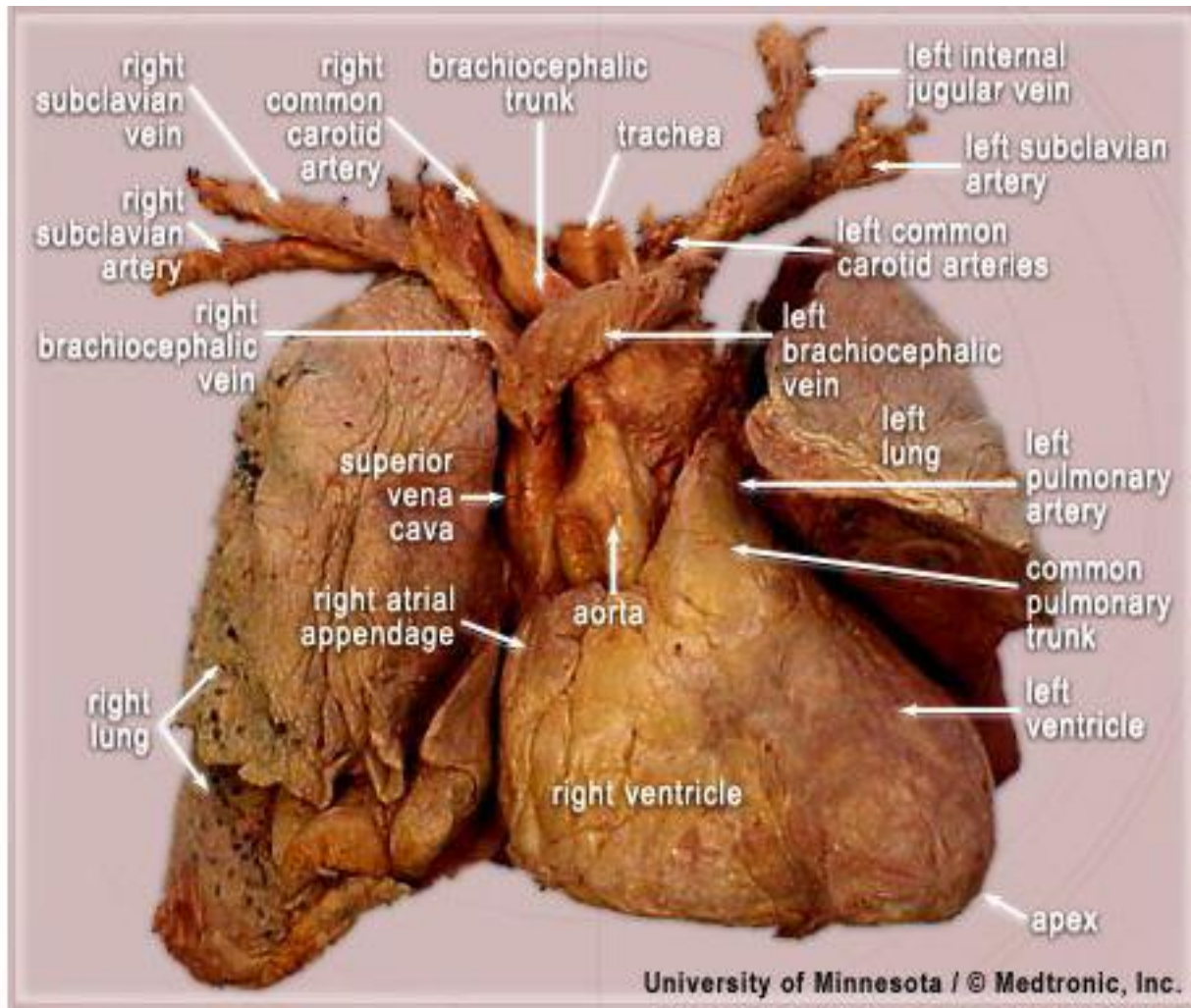
Brain

4



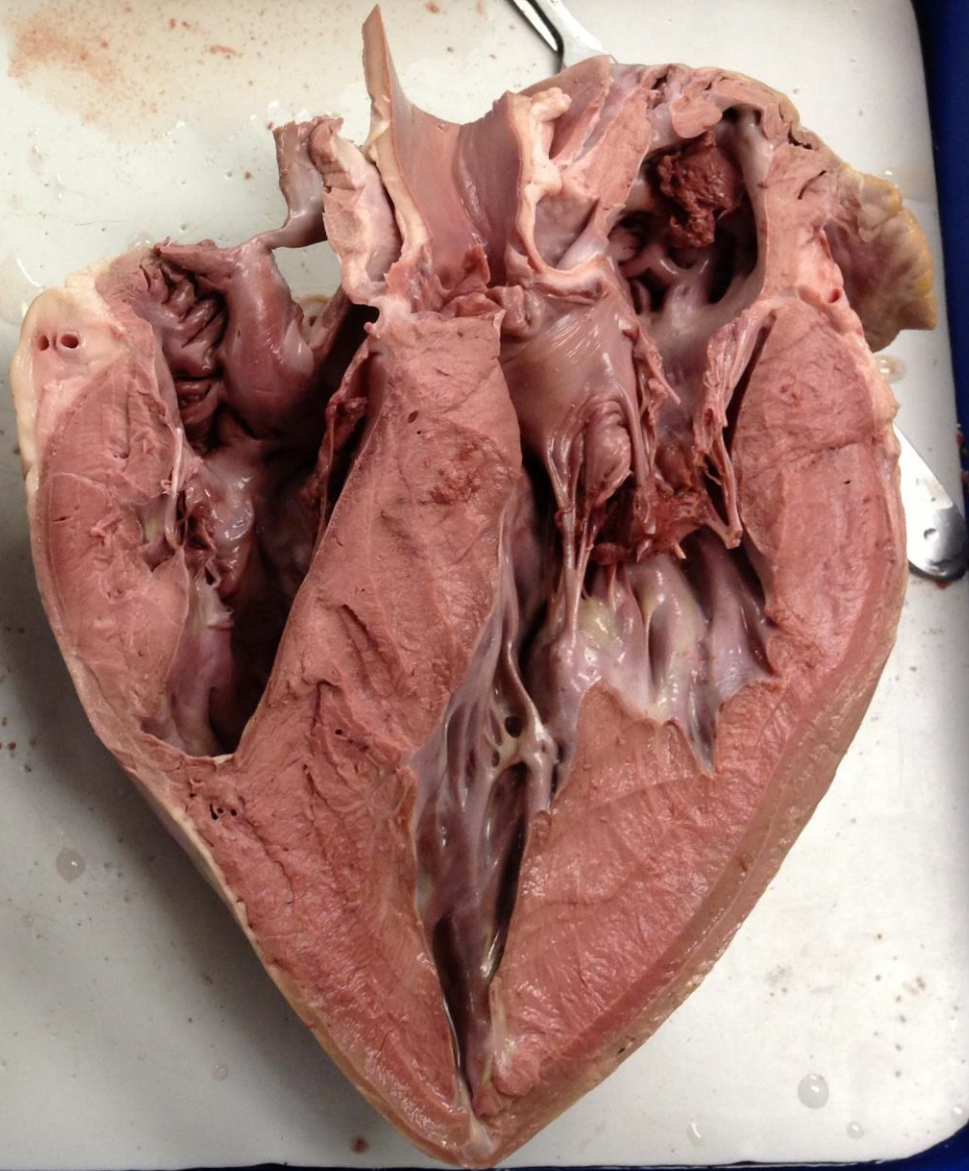
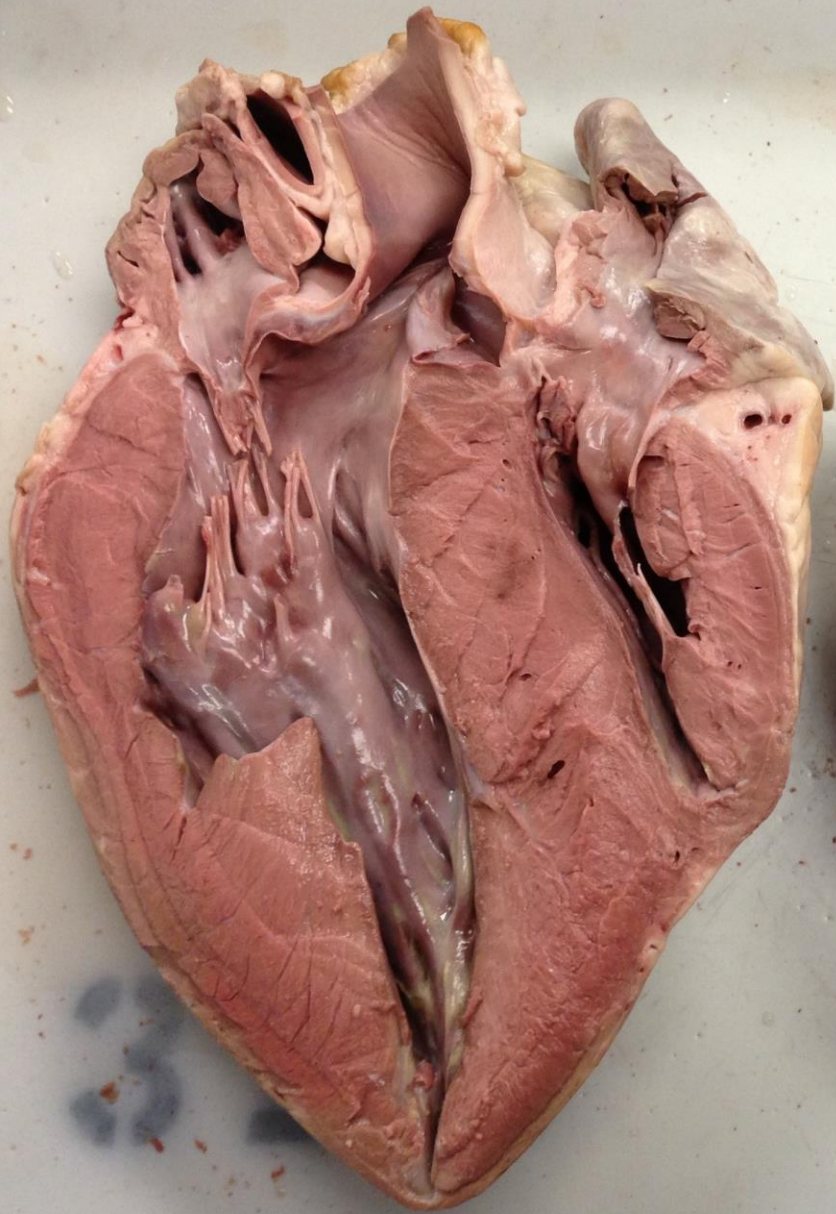
Heart and Lungs

6



Heart Cross Section

8



Physiology

10

- The study of how the body and its parts work or function.
- Is dynamic and can be studied through experiments and uses the principles of chemistry and physics.
- Often studied on living subjects, for example the digestion of food or the beating of a heart.

Beating Heart

11

Heart Beating

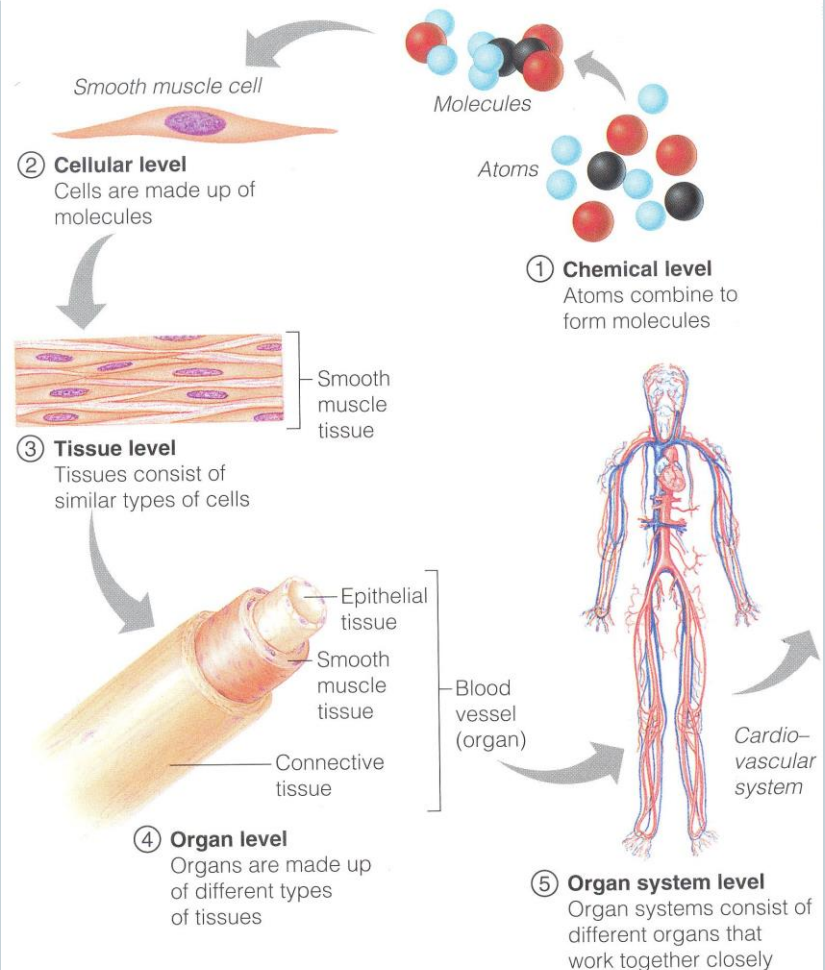
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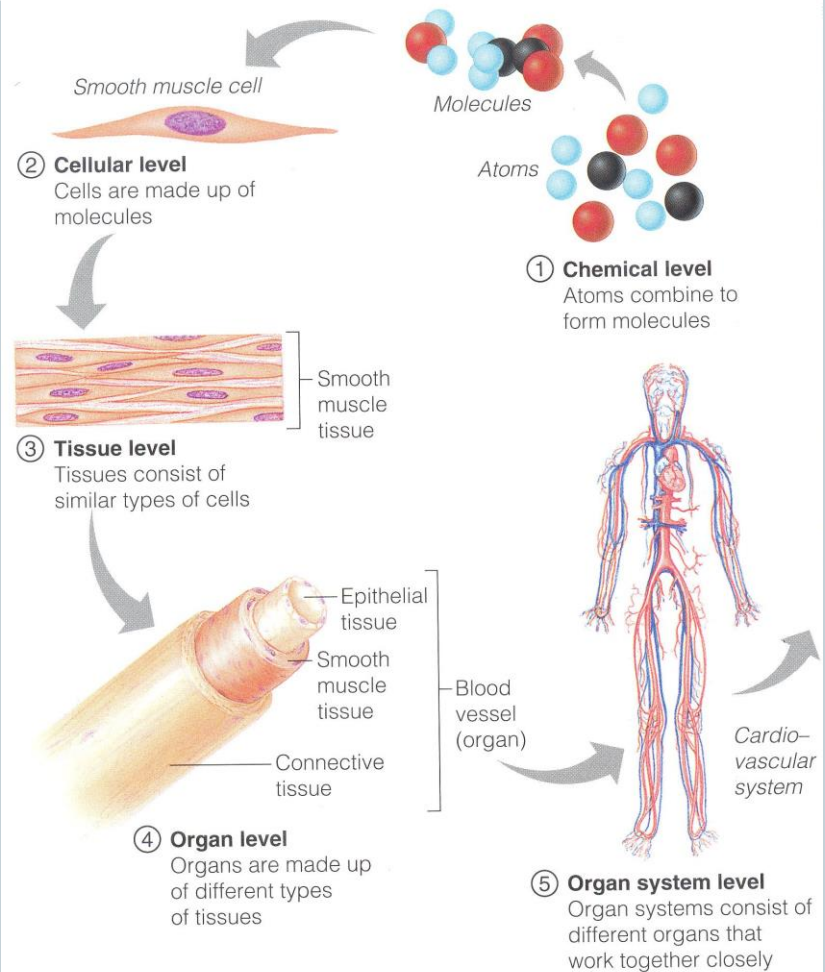
Levels of Structural Organization

13

- **Chemical Level**-The simplest level of organization or the chemical level.
- **Cells**-The smallest unit of living things.



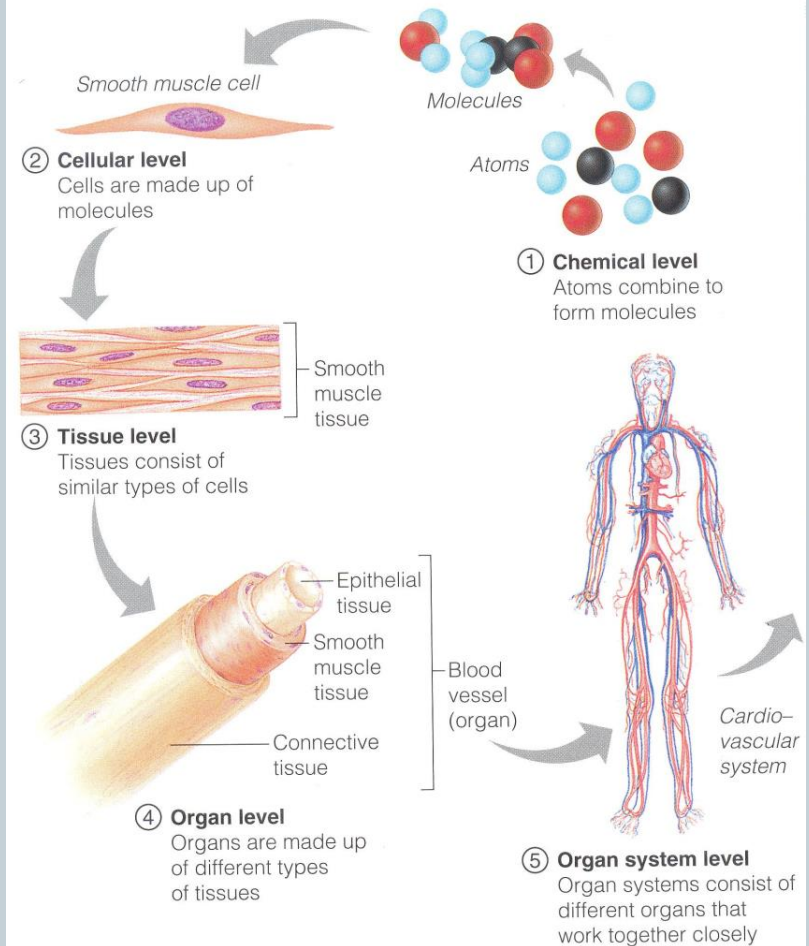
- **Tissues**-Collections of cells with a common function.
- **Organs**-Composed of two or more tissue types. Ex. Stomach, liver, intesines.



- **Organ Systems**-A group of organs that work together to accomplish a common purpose. Ex. Digestive system.
- **Organism**-The living body



⑥ **Organismal level**
Human organisms are made up of many organ systems



Increasing Complexity

16

ORGAN SYSTEM CELL ORGANISM ORGAN TISSUE

Decreasing Complexity

17

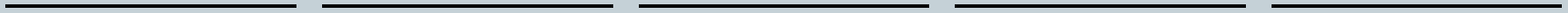
ORGAN SYSTEM

CELL

ORGANISM

ORGAN

TISSUE



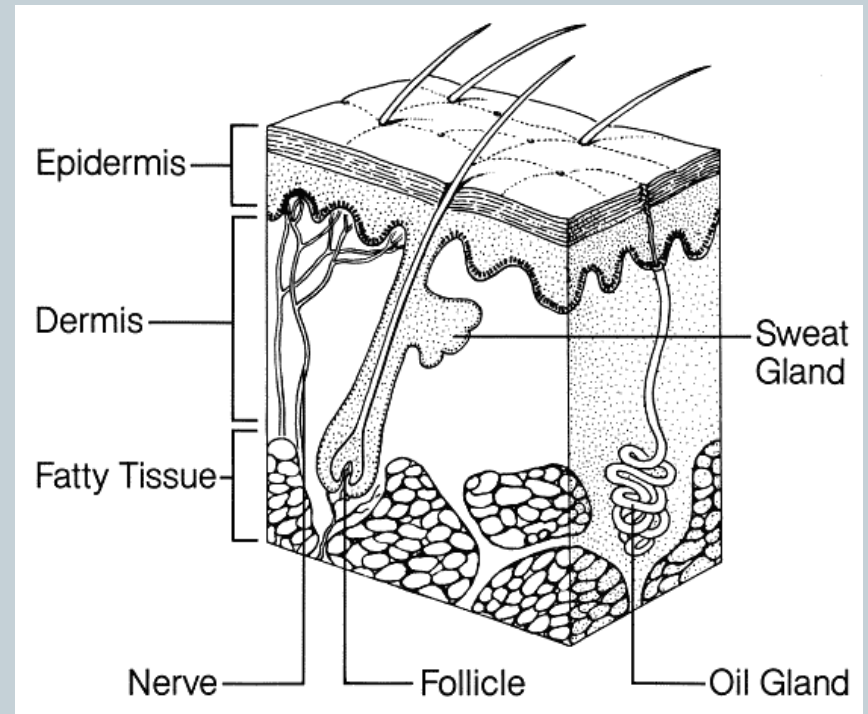
Organ System Overview

18

Integumentary System

19

- The external covering of the body or the skin.
- Waterproofs and cushions the body.
- Protects underlying organs from drying out and mechanical damage.
- Common damage to the skin include cuts and sunburn.

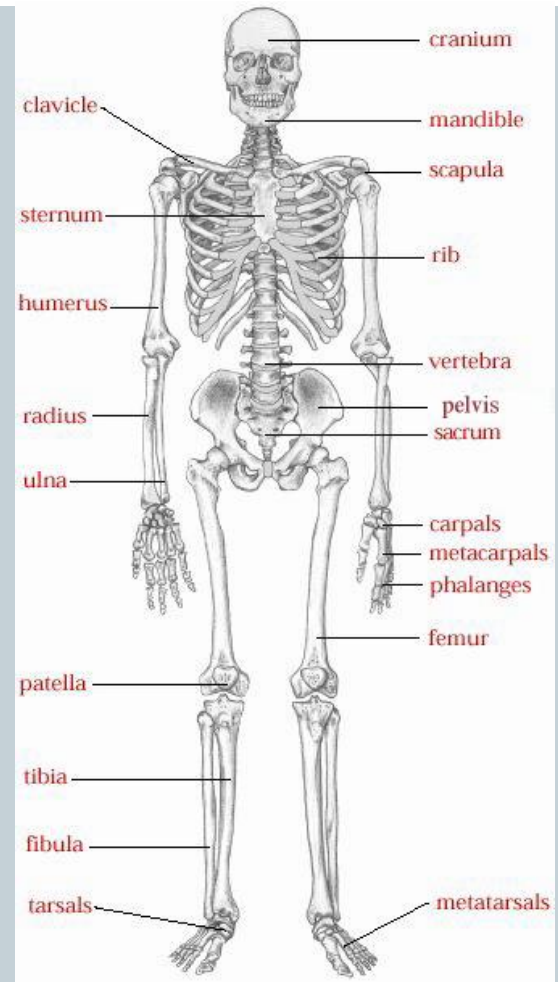




Skeletal System

21

- Consists of bones, cartilage, ligaments and joints.
- Supports the body and provides a framework for skeletal muscles to attach.

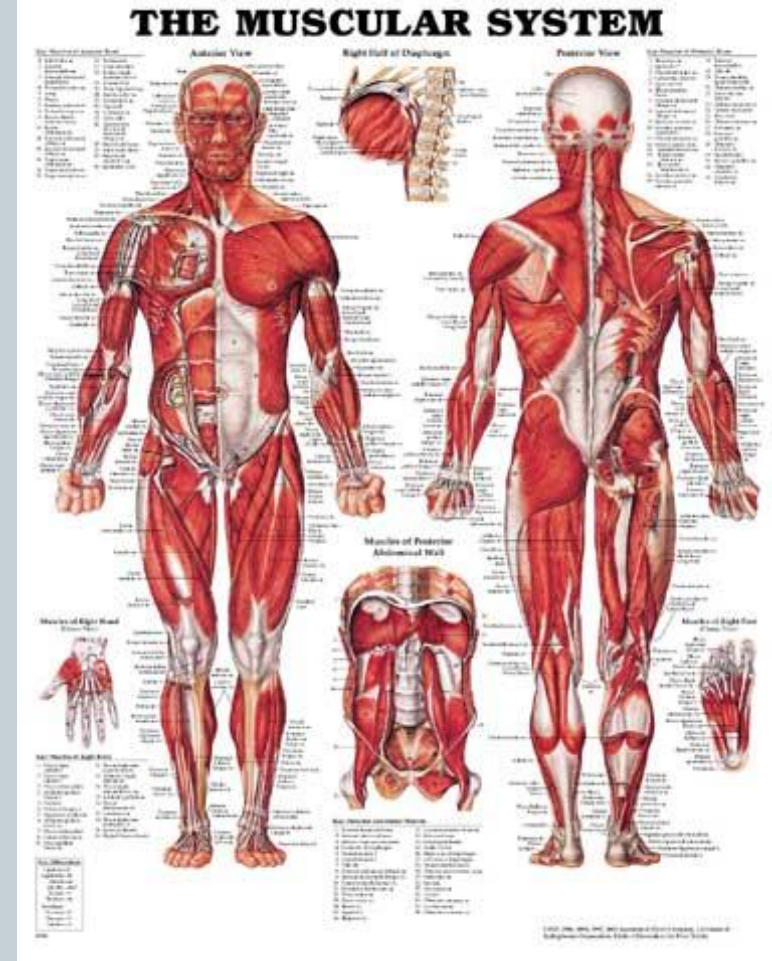




Muscular System

23

- Muscles contract or shorten to provide movement.
- Maintains posture and produces heat.
- Moves limbs.
- Allows facial expression.



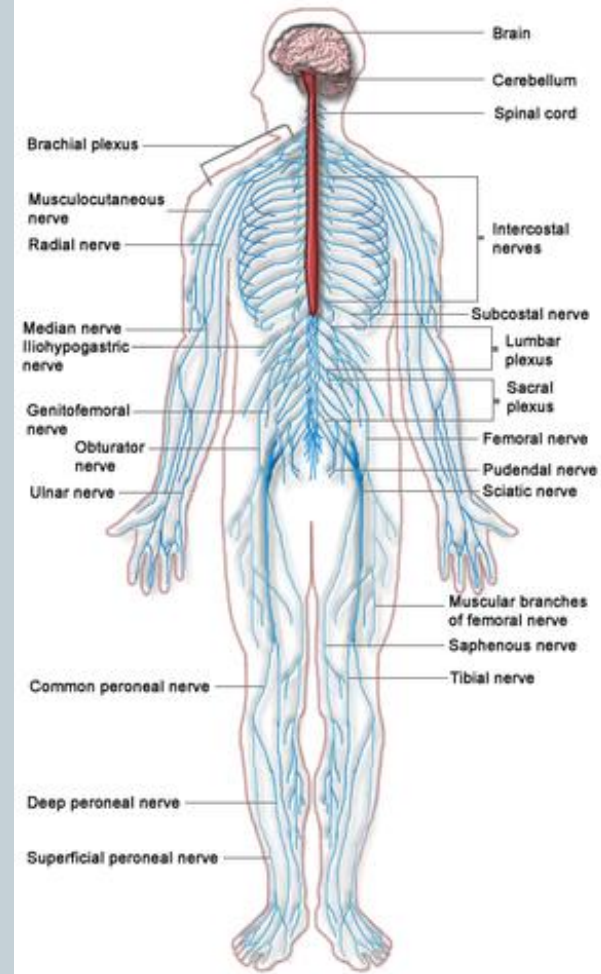


The Physio Club

Nervous System

25

- Fast acting control system.
- Responds to internal and external changes in the body.



Real Nervous System Pictures

26

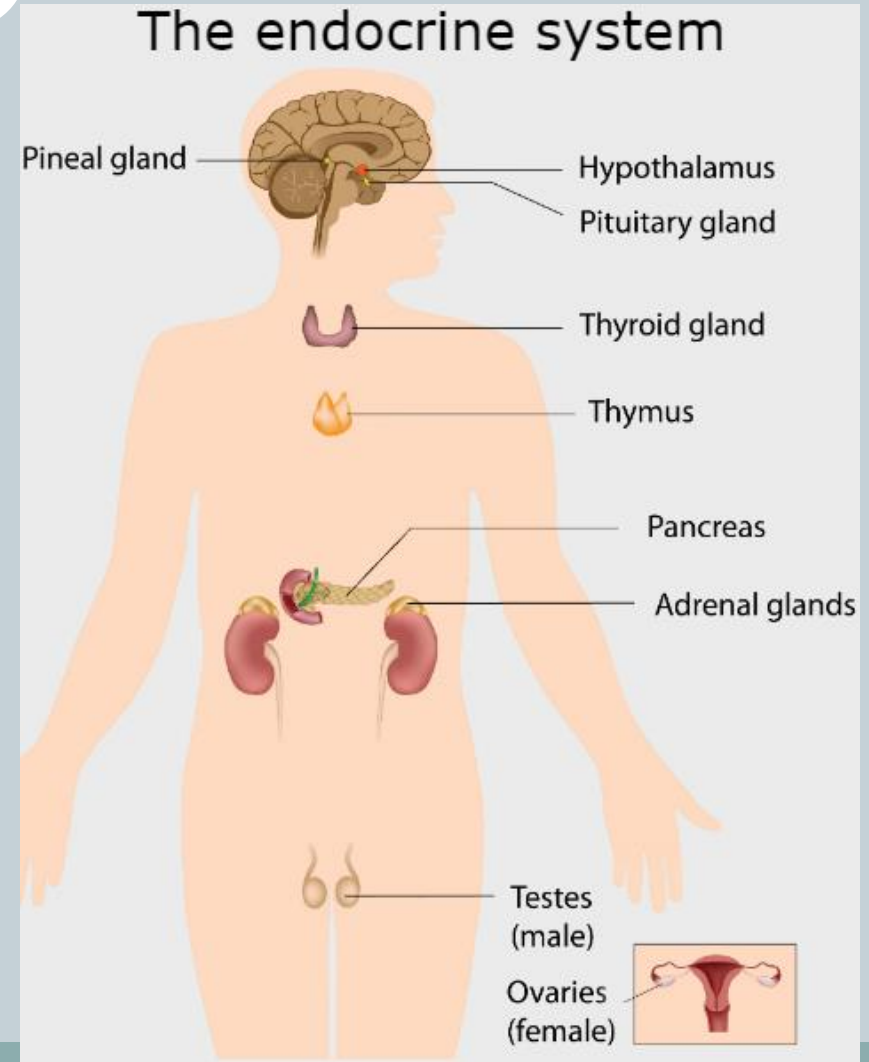




Endocrine System

29

- Glands secrete hormones that regulate processes such as growth, reproduction and nutrient use.
- Controls the body with chemicals called hormones.
- Glands include the thyroid, ovaries, testes, pituitary, adrenal and pancreas.



Nervous vs Endocrine

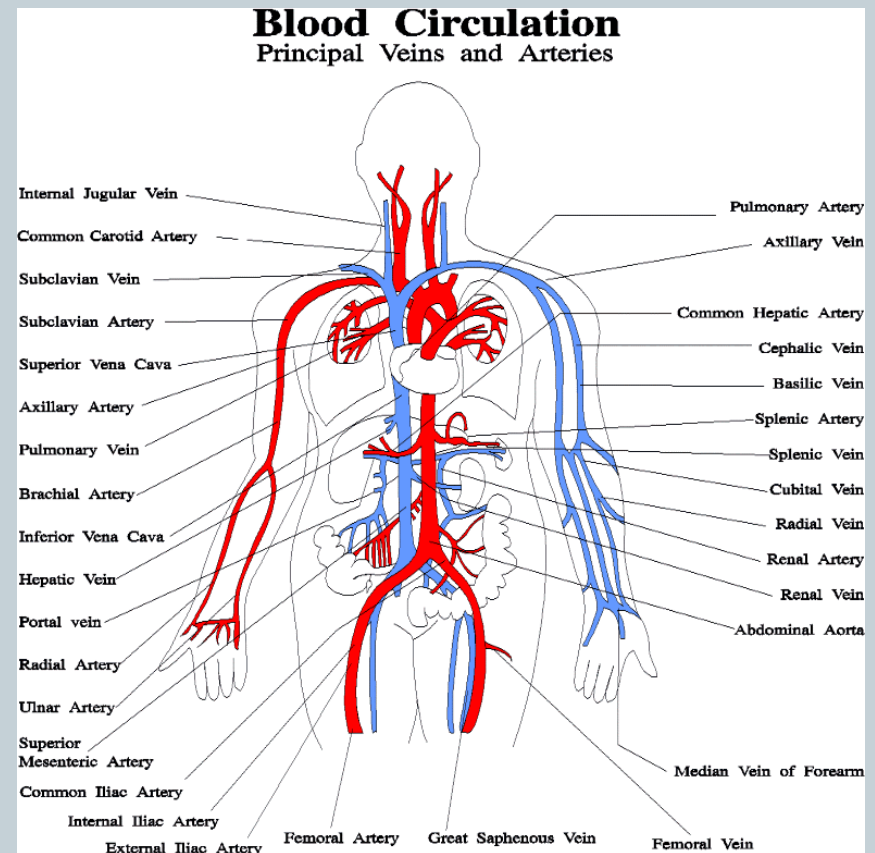
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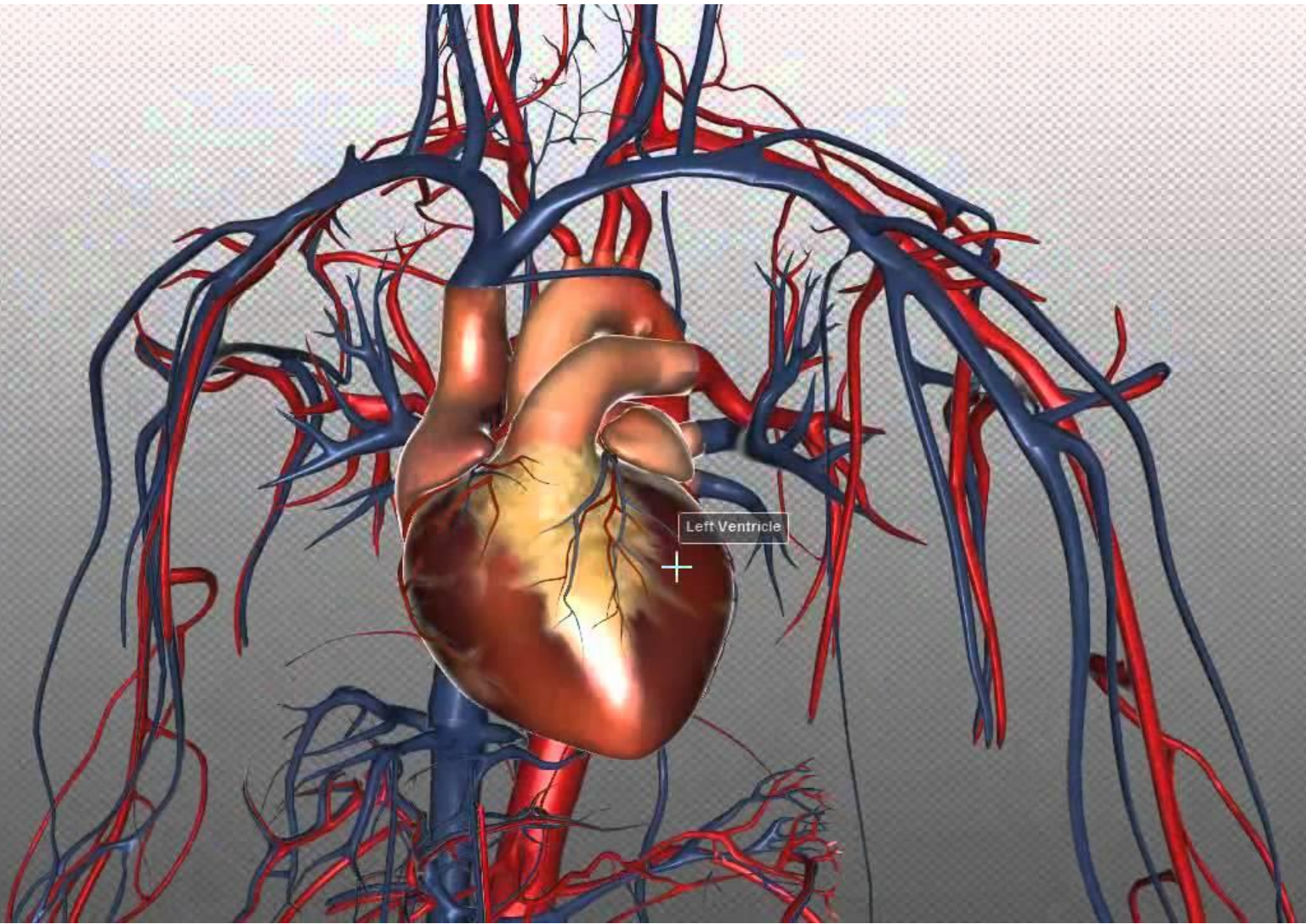
- The nervous system is many times faster than the endocrine system. This is a necessity for survival, for example, being able to dodge something heading towards you.
- Endocrine hormones work much slower.

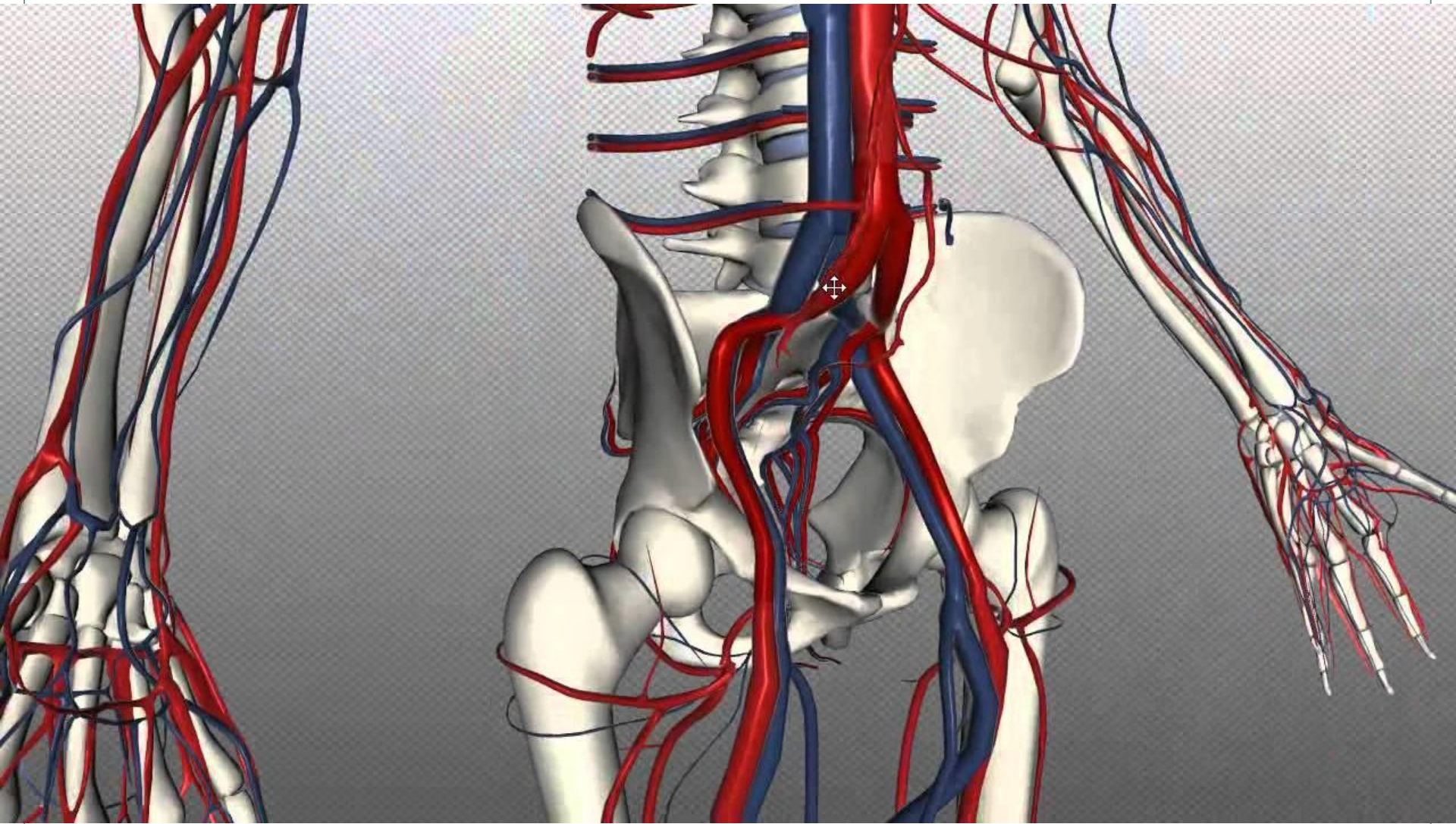
Cardiovascular System

31

- Heart pumps blood throughout the body in blood vessels.
- Blood vessels transport blood to the body tissues which carries oxygen, carbon dioxide, nutrients and wastes.



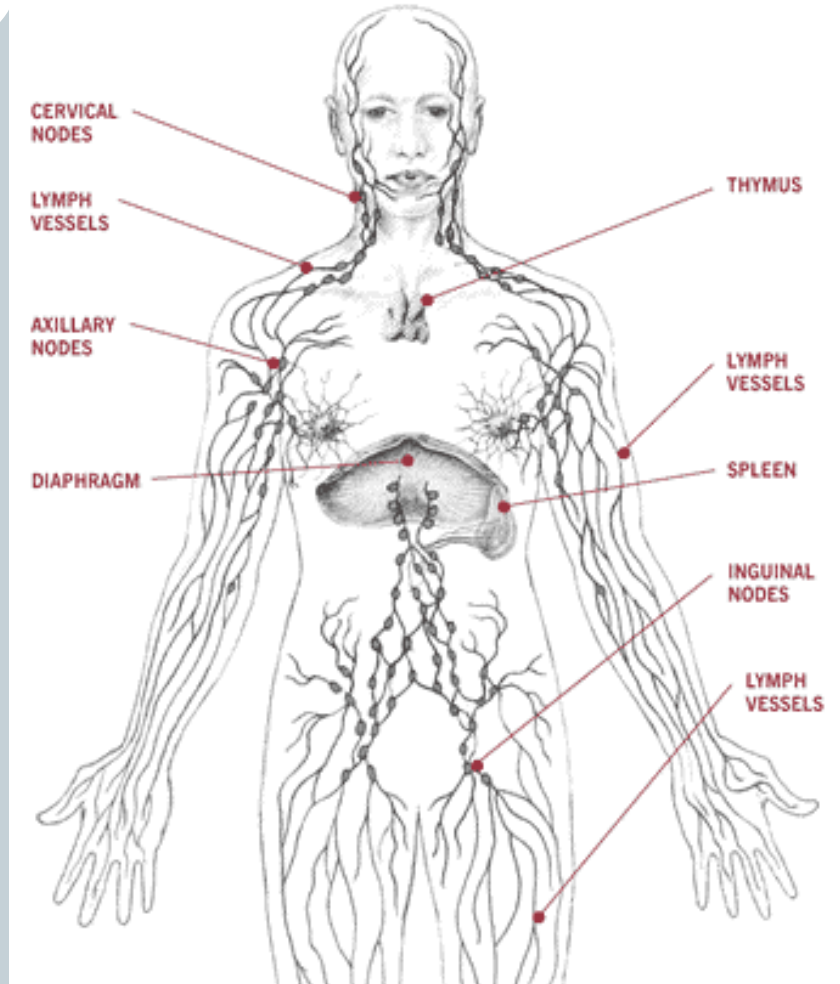




Lymphatic System

34

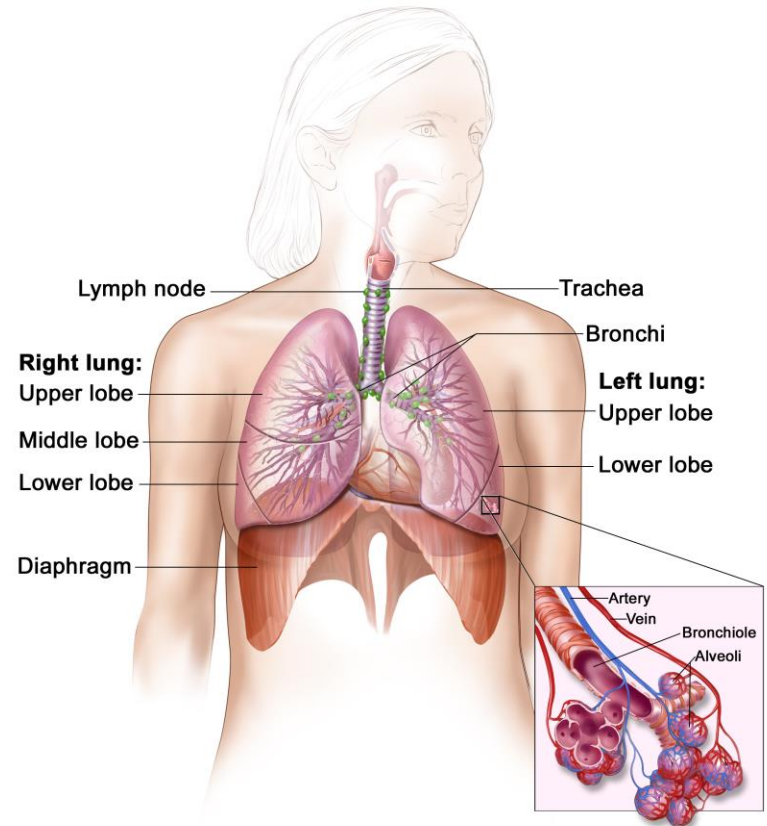
- Picks up fluid leaked from blood vessels and returns it to the blood.
- Houses white blood cells involved in immunity.
- Destroys bacteria and tumor cells.



Respiratory System

35

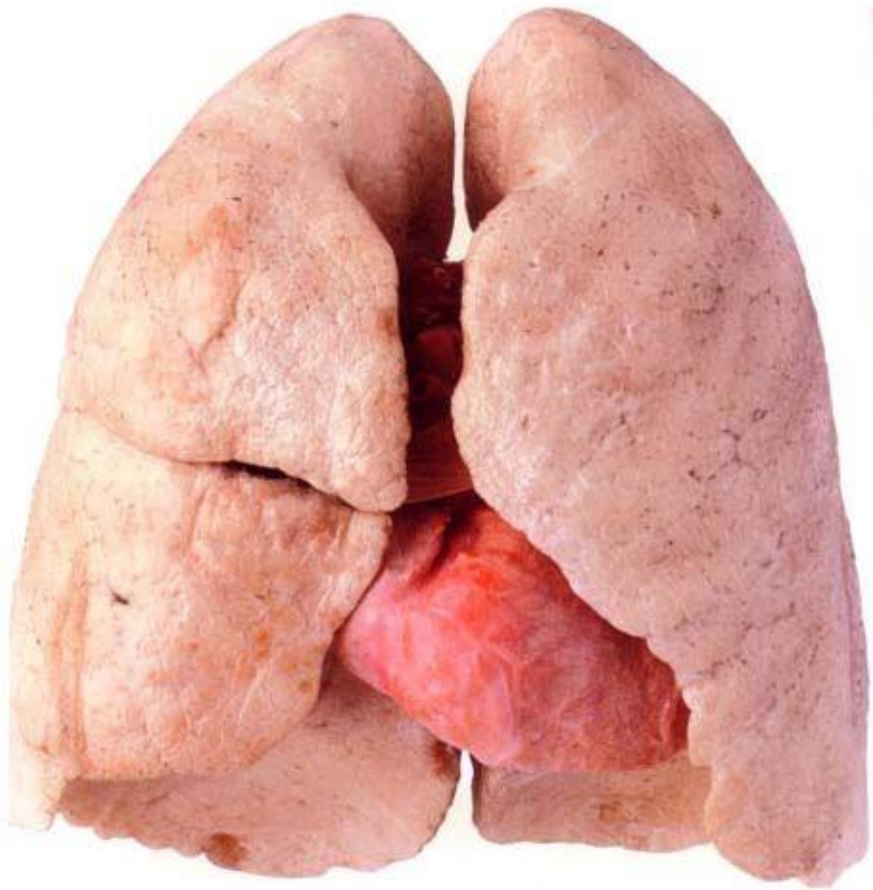
- Keeps blood constantly supplied with oxygen and removes carbon dioxide which occurs in the lungs.



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Non-Smoker vs Smoker

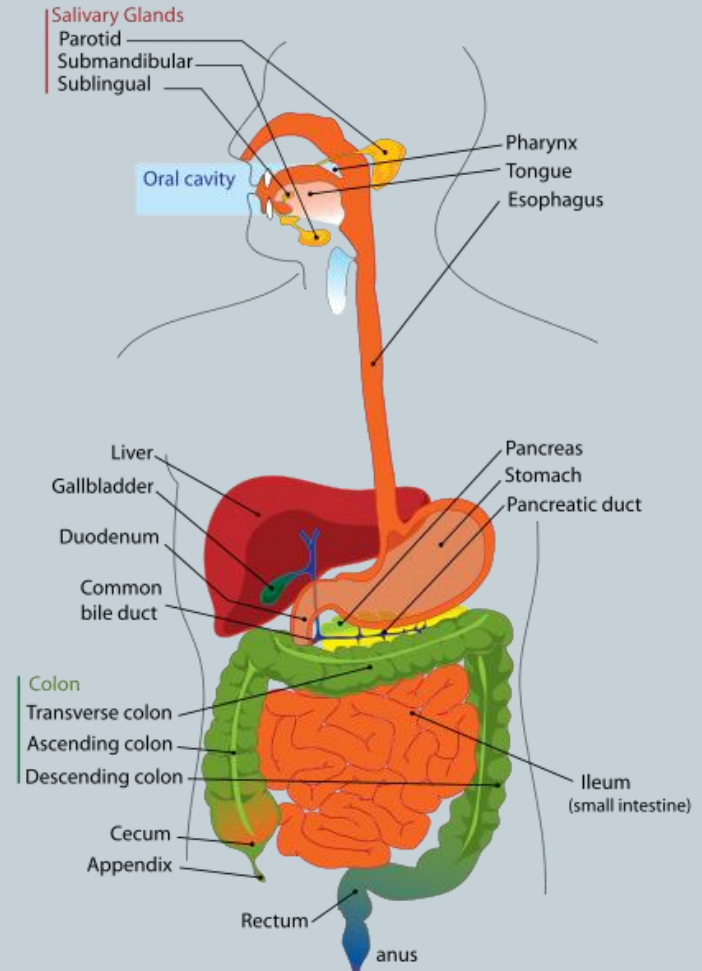
36



Digestive System

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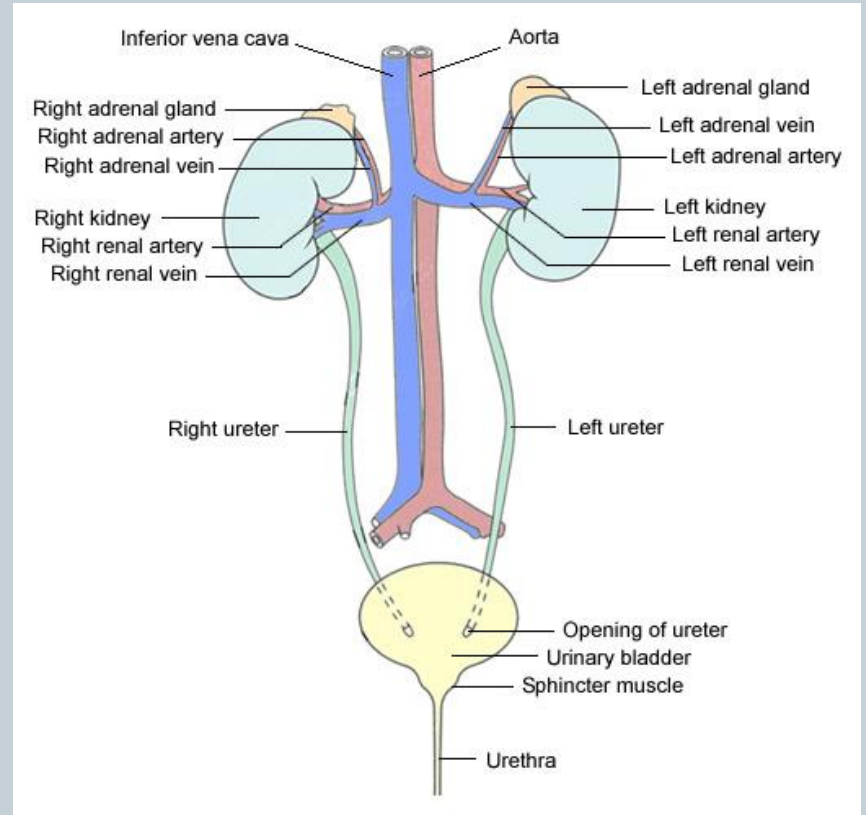
- Breaks food down into absorbable units that enter the blood for distribution to the body. This is called digestion done with enzymes.



Urinary System

39

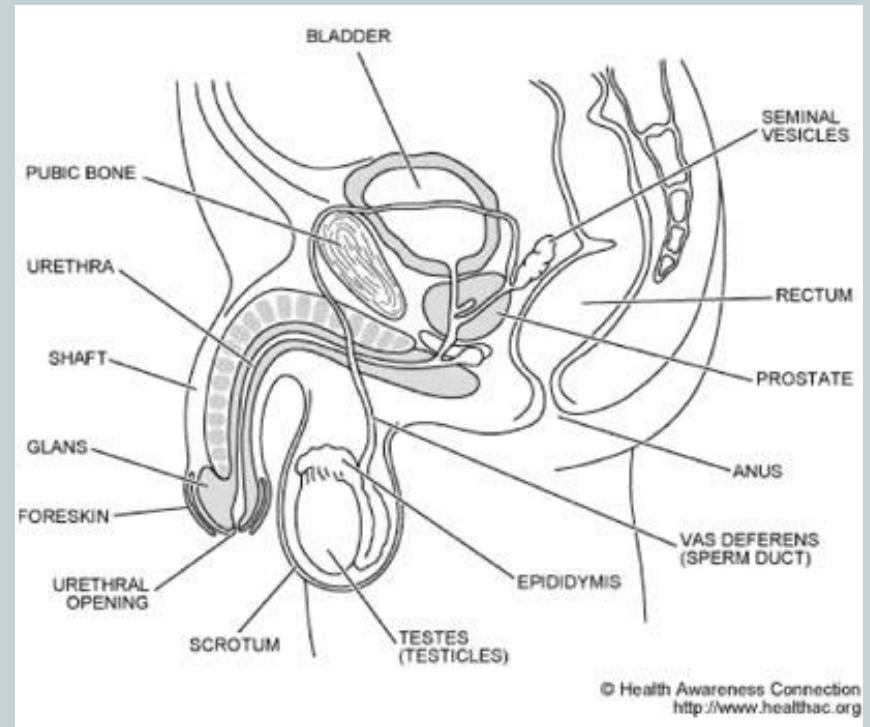
- Eliminates nitrogenous wastes from the body and regulates water.



Male Reproductive System

40

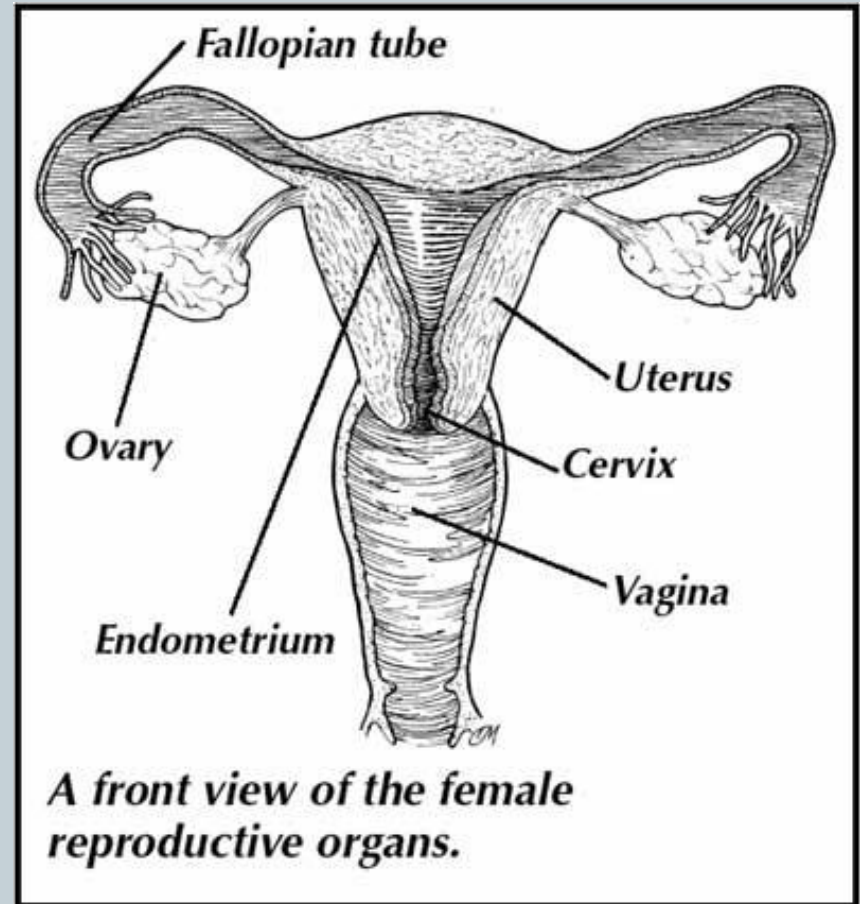
- To produce offspring.
- Testes produce sperm and the male sex hormone testosterone.



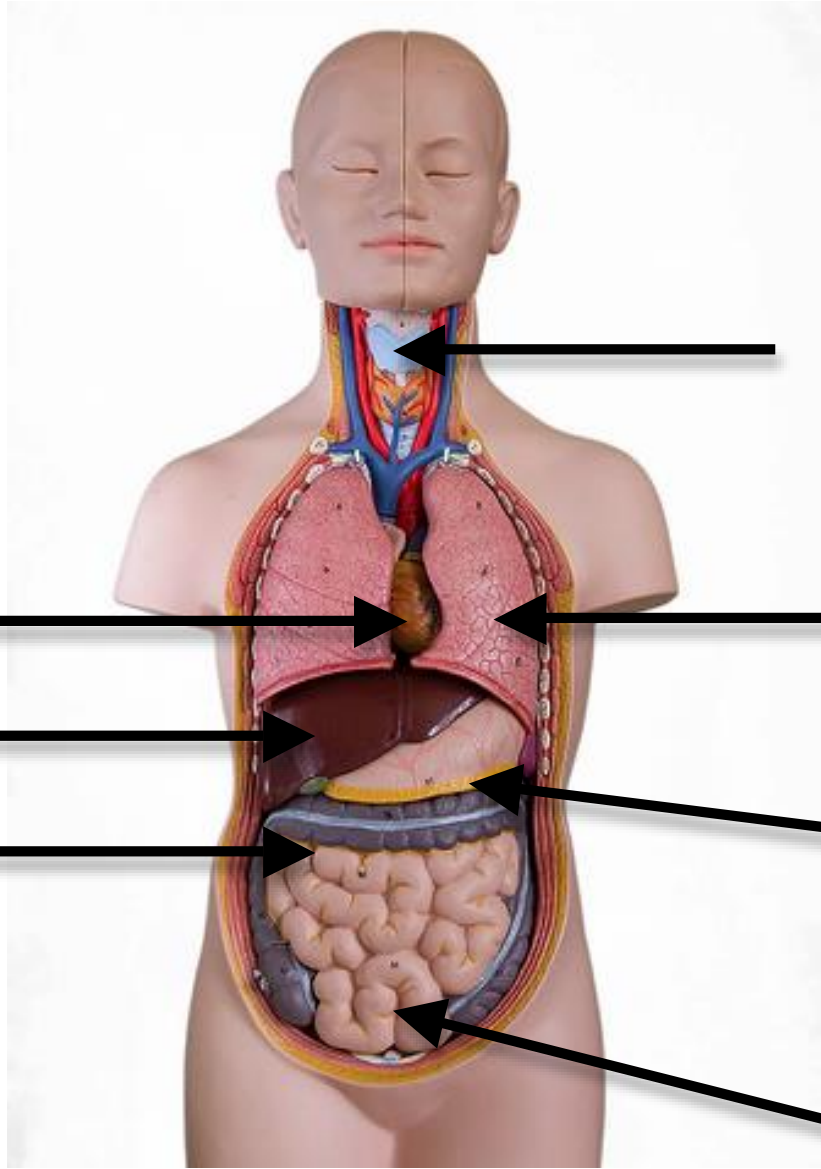
Female Reproductive System

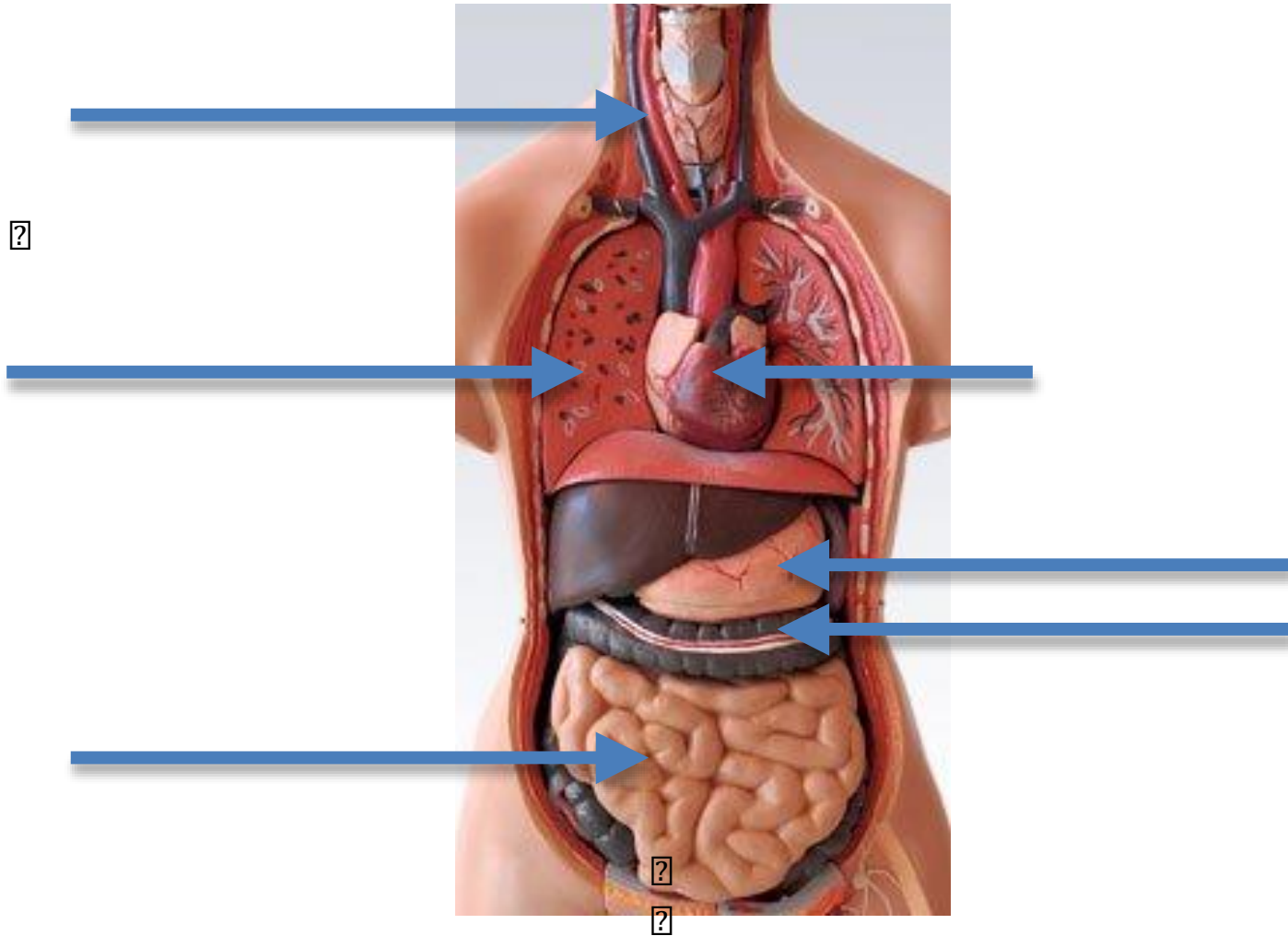
41

- Ovaries produce eggs and female sex hormones.
- Structures provide sites for fertilization and development.
- Mammary glands produce milk to nourish the newborn.
- Provides for conception and childbearing.



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The large intestines get their name because they are **WIDER** than the small intestines, not **LONGER**.

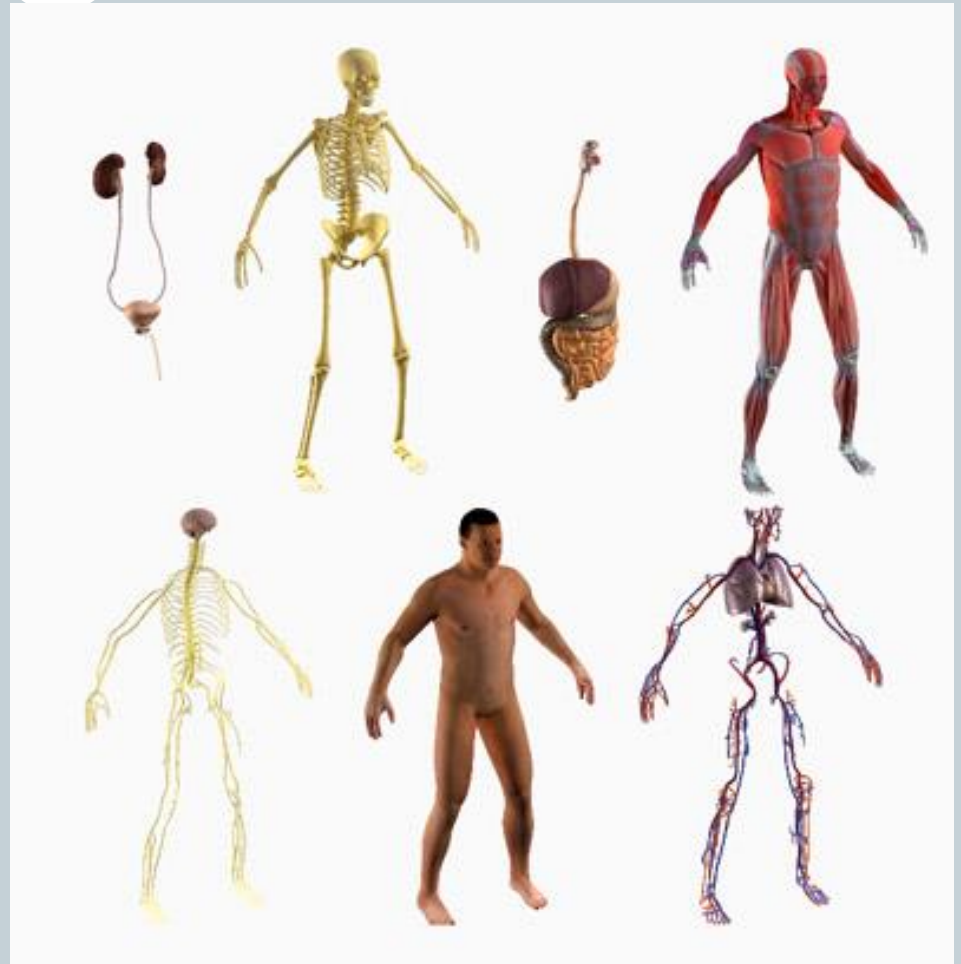
Maintaining Life

44

Maintenance of Boundaries

45

- Keeps the body's internal environment distinct from the external environment.
- Membranes around organs as well as the skin.



Movement

46

- Includes all the activities promoted by the muscular system.
- Walking, throwing or riding a bicycle.



Responsiveness

47

- Ability to react to stimuli.
- Major role of the nervous system.



Digestion

48

- Food ingested is broken down to its chemical building blocks.



Metabolism

49

- All chemical reactions that occur within body cells.
- Breaks down complex molecules into smaller ones and makes larger molecules from smaller ones.
- Nutrients and oxygen to produce ATP in a process called cellular respiration.
- Regulated by hormones secreted by the glands of the endocrine system.

Excretion

50

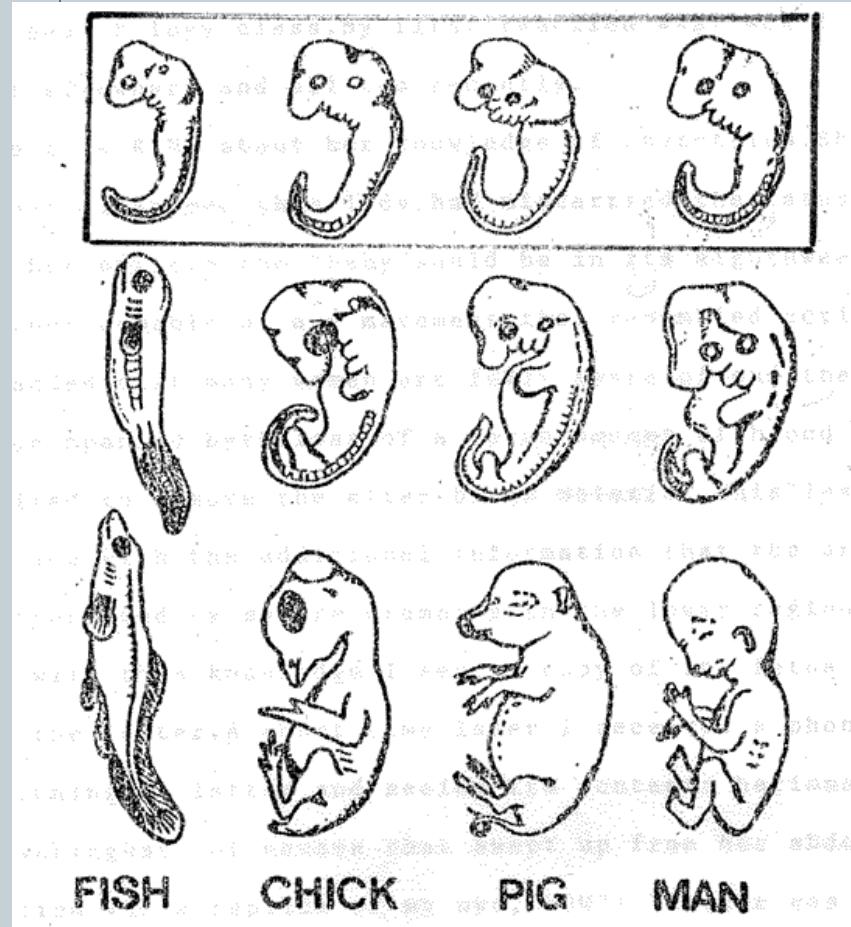
- Elimination of carbon dioxide by the lungs and elimination of nitrogenous wastes by the kidneys.
- NOT POOP, it was just a funny pic.



Reproduction

51

- Provides new cells for growth and repair.



Growth

52

- Increase the number of cells faster than they are destroyed.



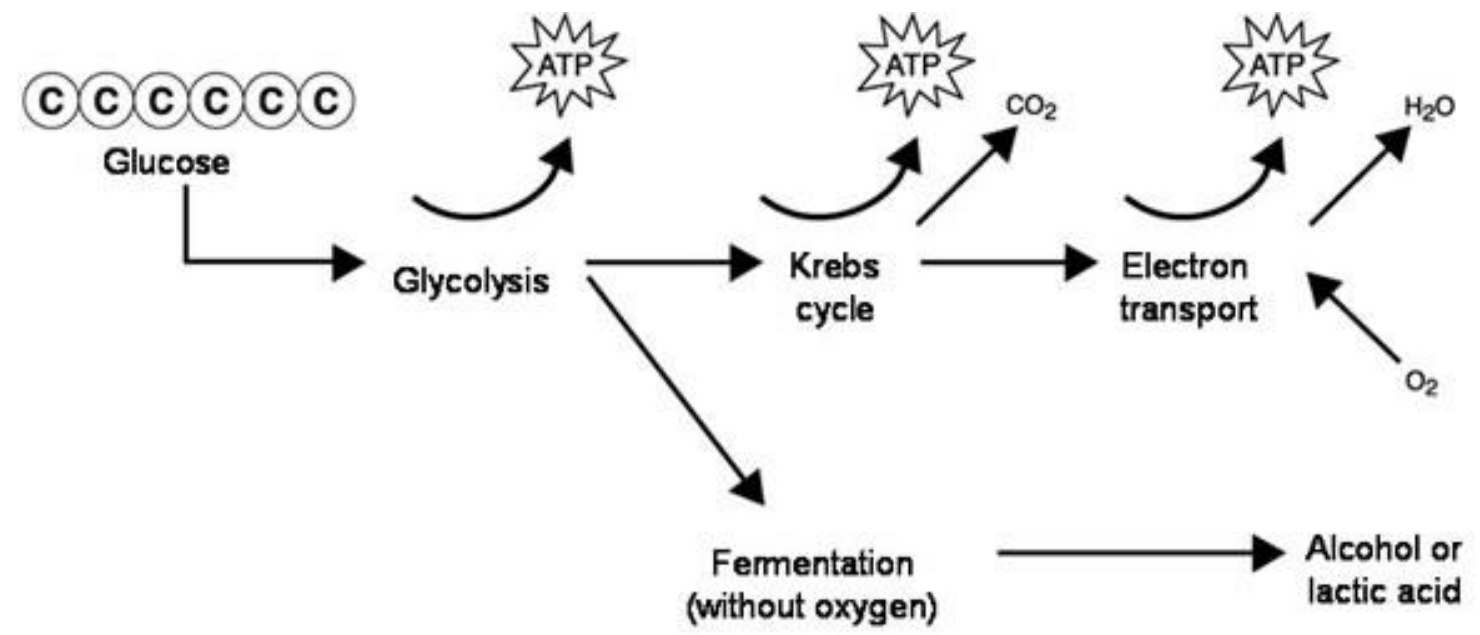
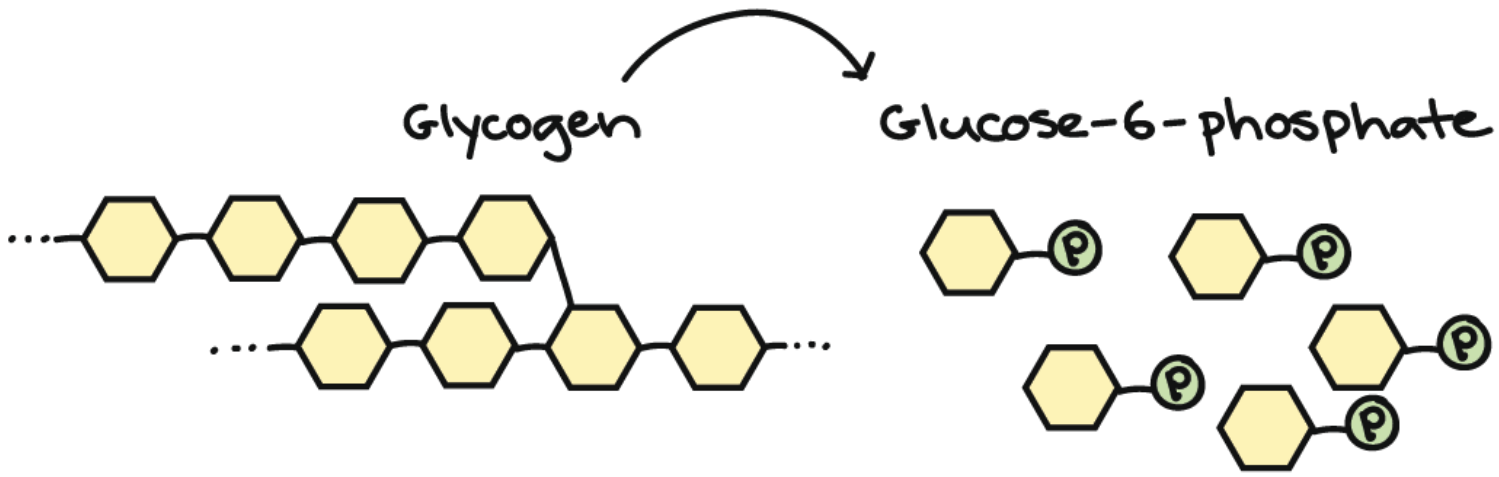
Survival Needs

53

Nutrients

54

- Taken in via the diet and contain chemicals used for energy and cell building.
- Carbohydrates, proteins and fats are sources of nutrients



Water

56

- 60-70% of the body' s weight.
- Provides the fluid base for body secretions and excretions.



WATER IS

75% OF BODY WEIGHT

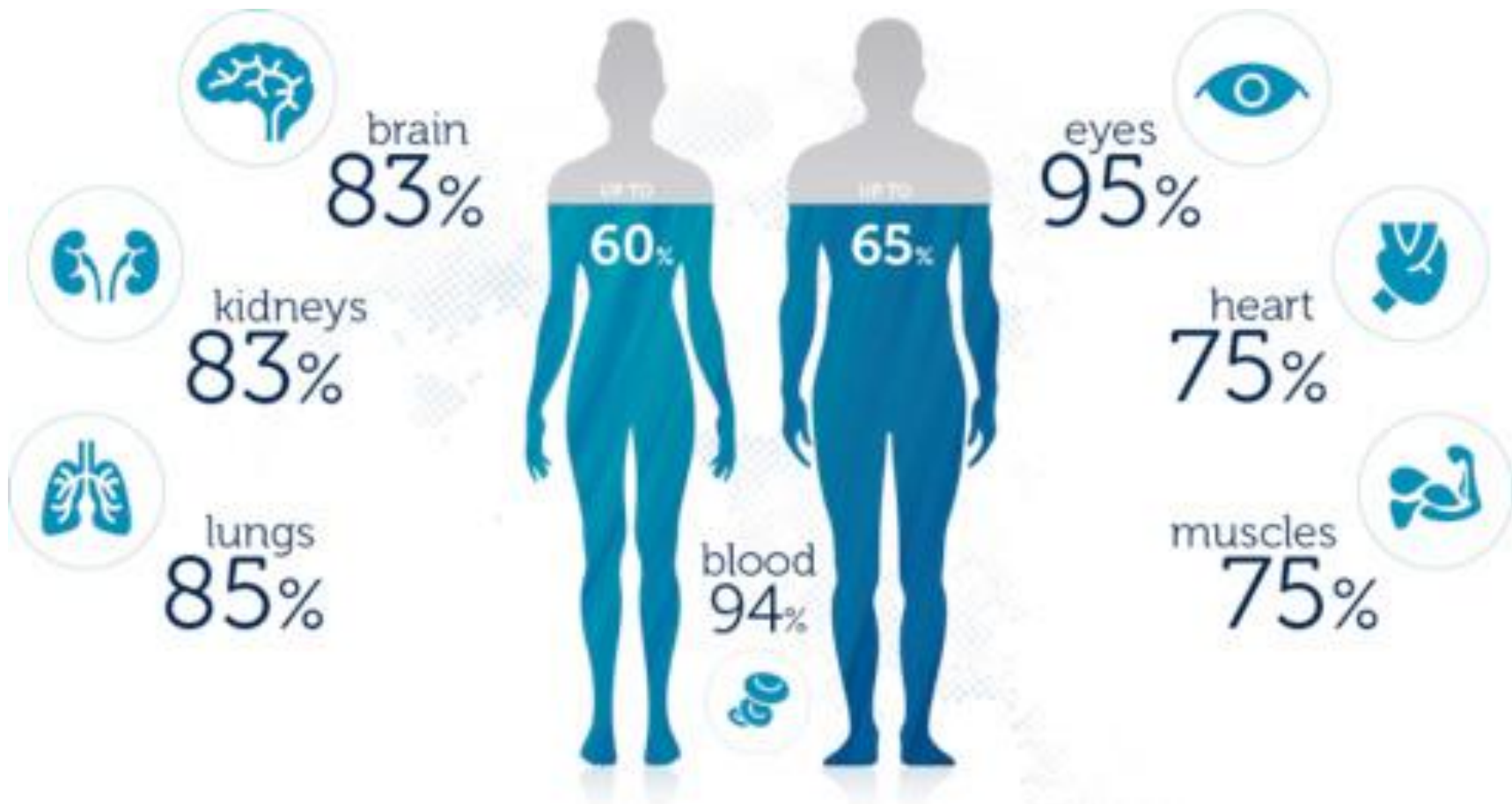
80% OF BRAIN

90% OF BLOOD

96% OF LIVER

HASSAN-9582237066

In the course of an average day without exercise, we lose 8-10 cups of water. Drink up, water is what makes you whole.

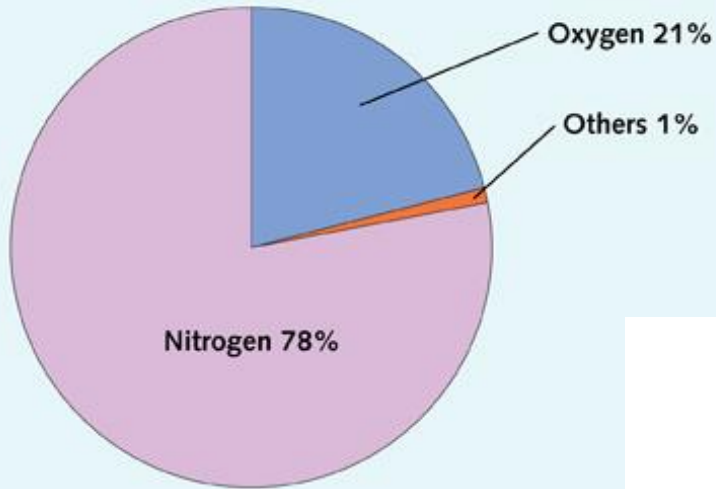


Oxygen

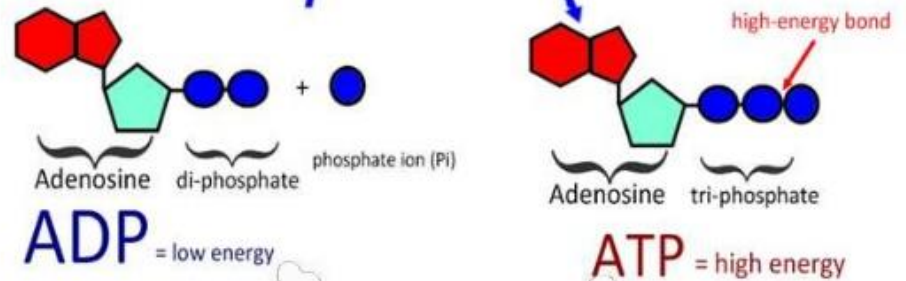
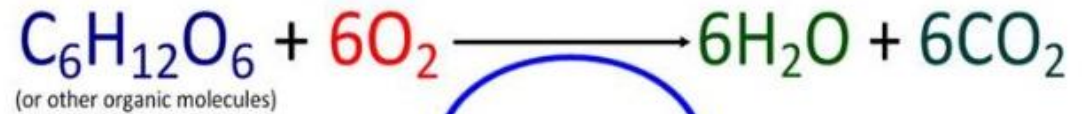
59

- Oxygen is necessary to release energy from chemical reactions that take place in the body.
- Needed to release energy from food.
- 20% of the air we breathe is oxygen
- Oxygen is made available to the body through efforts of the respiratory and cardiovascular systems.

What Elements Are Found in Air?



Cell Respiration



Body Temperature

61

- The body must remain at 37° C (98° F).
- If the temperature is too low, metabolic activities slow down.
- If the temperature is too high, chemical reactions proceed too quickly or proteins begin to break down or become nonfunctional.

Atmospheric Pressure

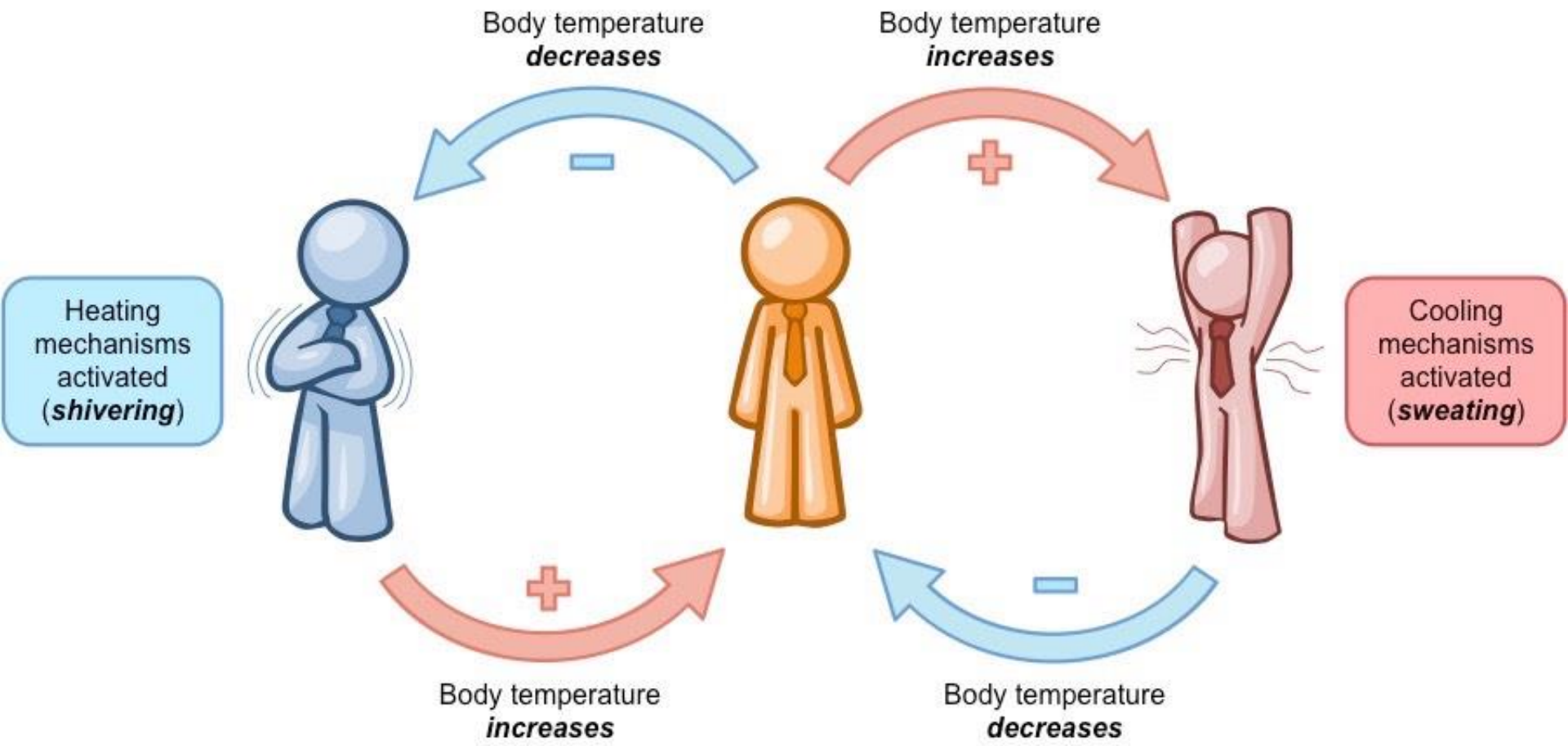
62

- Breathing depends on the pressure exerted on the body.
- If the altitude is too high (lower pressure) gas exchange may be too low to support metabolic activity.
- Mountain climbers need to bring oxygen tanks because oxygen is needed to support metabolic activities.

Homeostasis

63

- The tendency of the body's systems to maintain a relatively constant or balanced internal environment.



Homeostatic Control Mechanisms

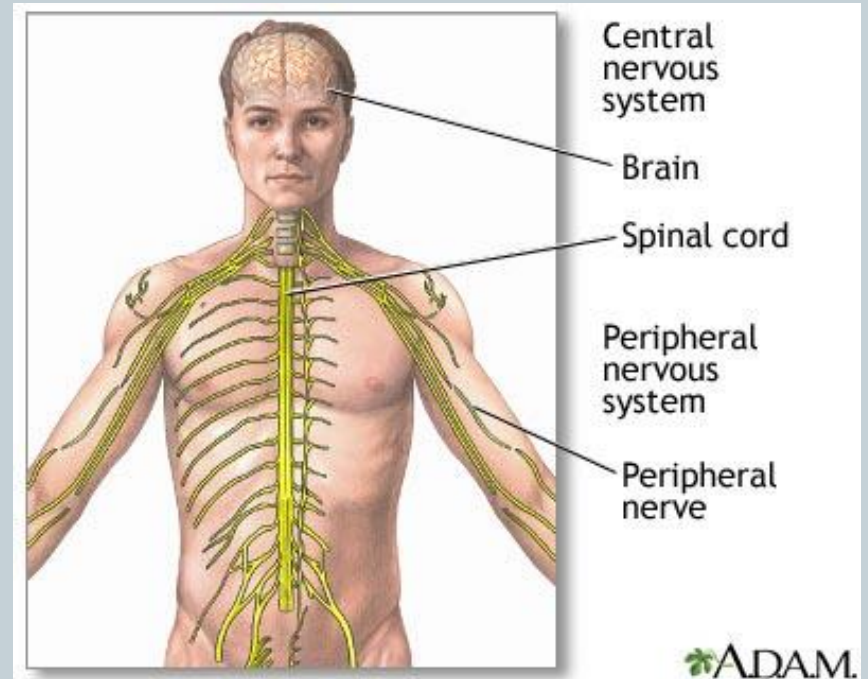
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- Communication between organ systems is essential.
- The nervous and endocrine systems are chiefly responsible through chemical or electrical responses.
- Require a receptor, a control center and an effector.

Receptor

66

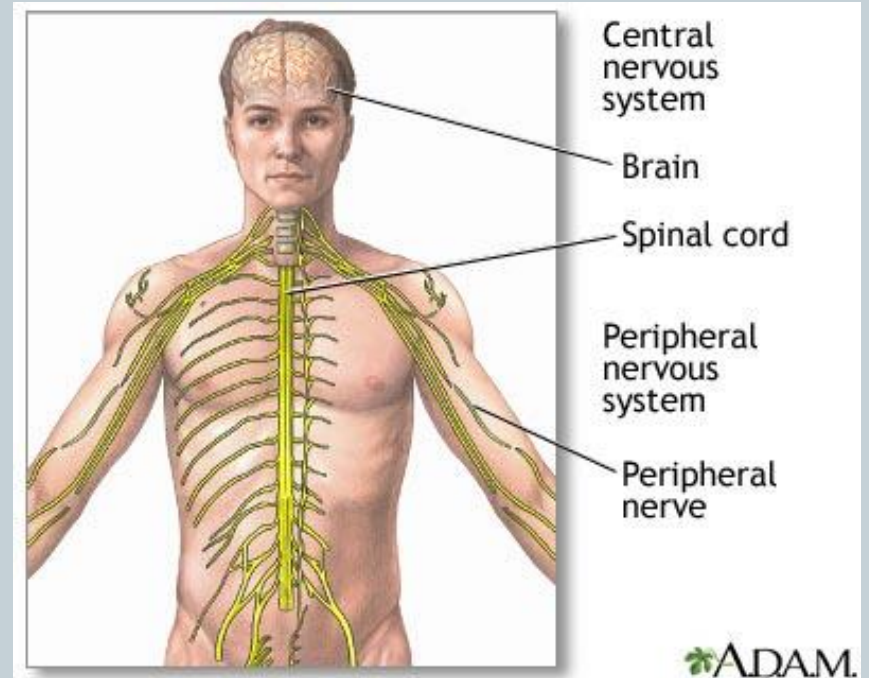
- A sensor that monitors changes in the environment called stimuli.
- Message is sent to the control center along the afferent pathway.



Control Center

67

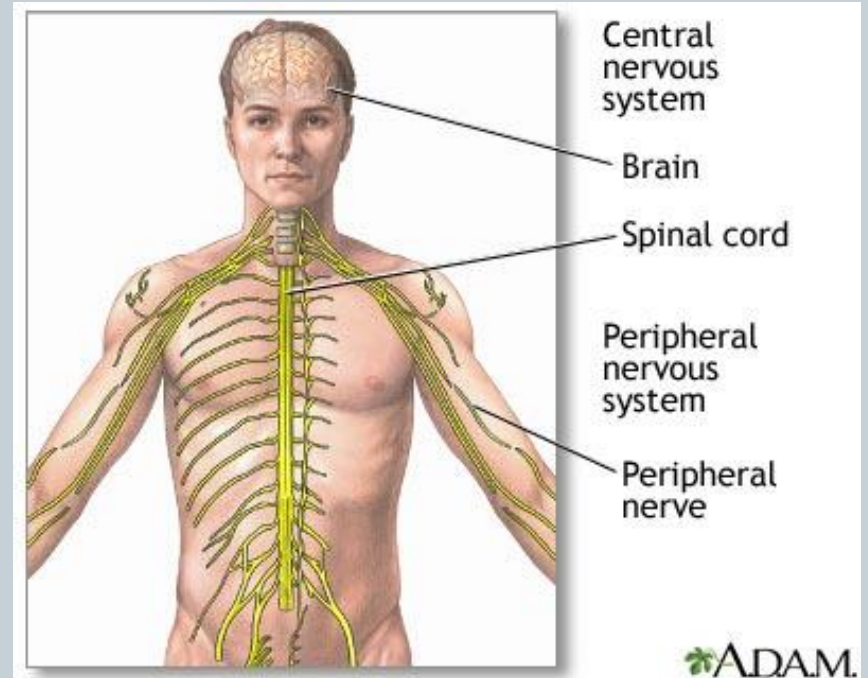
- Analyzes the information from the receptor and determines the appropriate response.

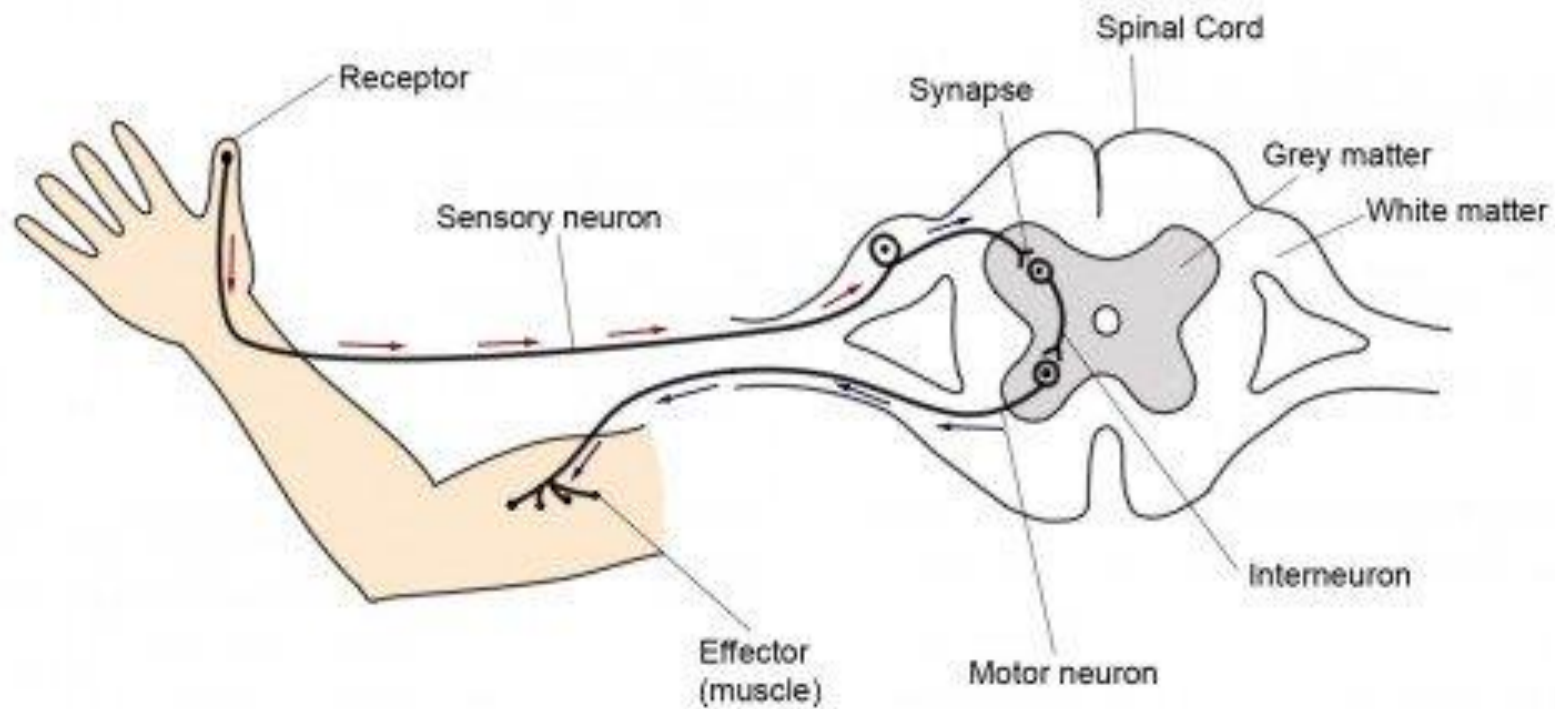


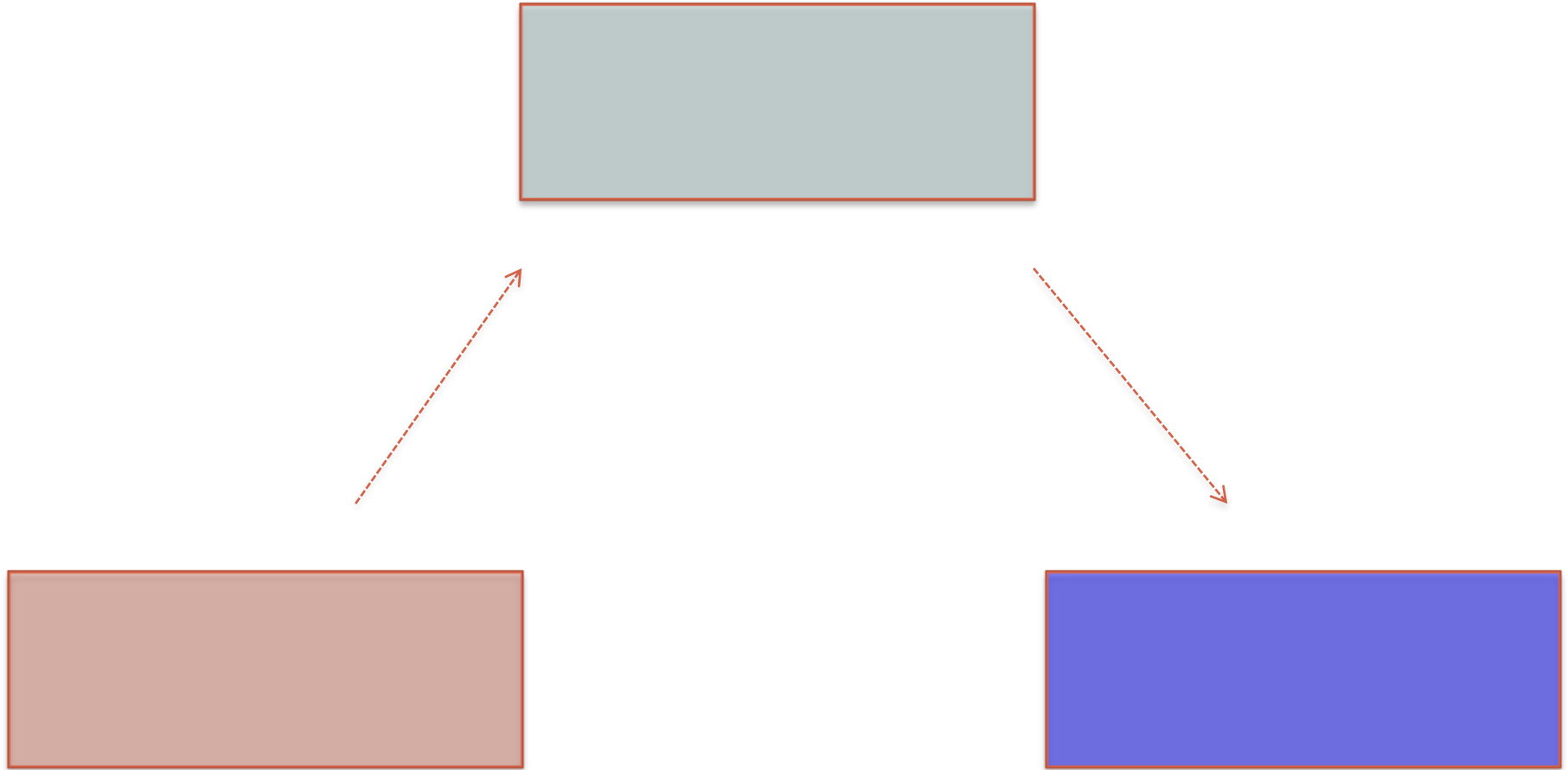
Effector

68

- Control center determines the response and activates the effector.
- Provides the means for the control centers response to the stimulus along the efferent pathway.
- The effector is usually a muscle or gland.







****This occurs between the muscular and nervous system**

Negative Feedback Mechanism

71

- The net effect of the response to the stimulus is to shut off the original stimulus or reduce its effects.
- Example-body releases insulin when sugar is ingested.
- Most common feedback system in the body.

Positive Feedback Mechanisms

72

- Increases or enhances the original stimulus.
- Examples are blood clotting or the birth of a baby.

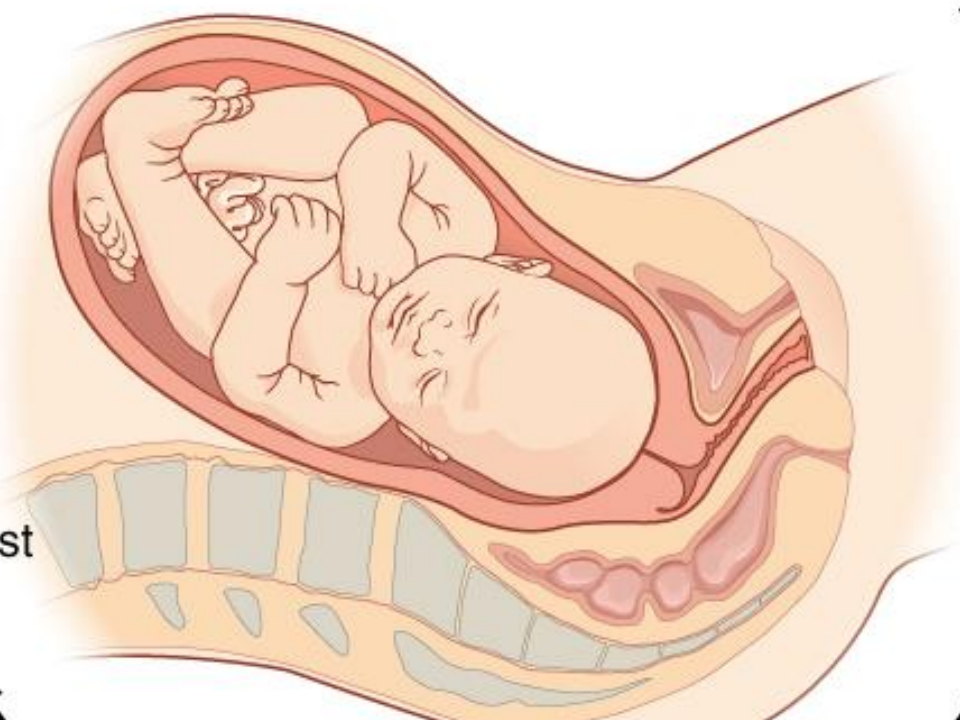
Nerve impulses from cervix transmitted to brain

Brain stimulates pituitary gland to secrete oxytocin

Head of baby pushes against cervix

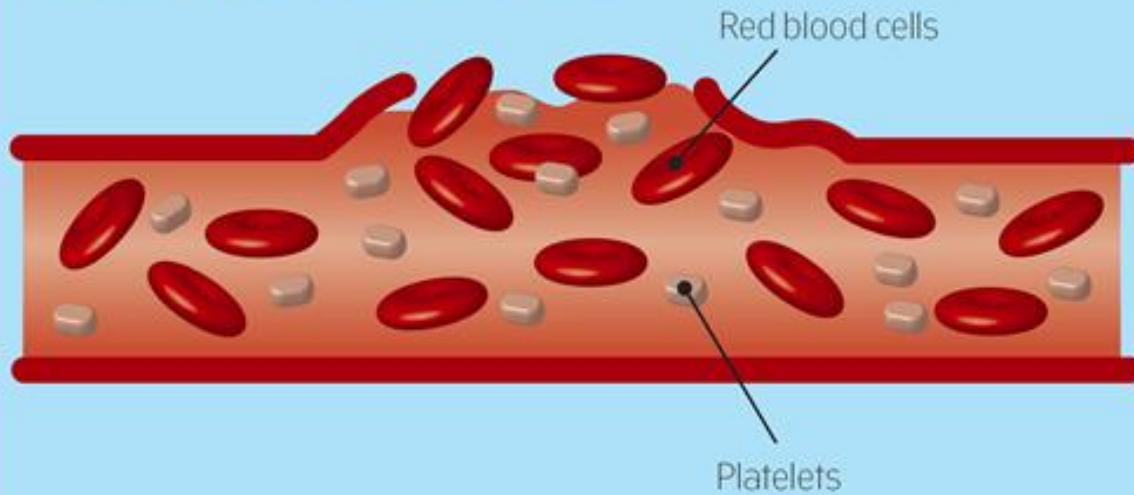
Oxytocin carried in bloodstream to uterus

Oxytocin stimulates uterine contractions and pushes baby towards cervix

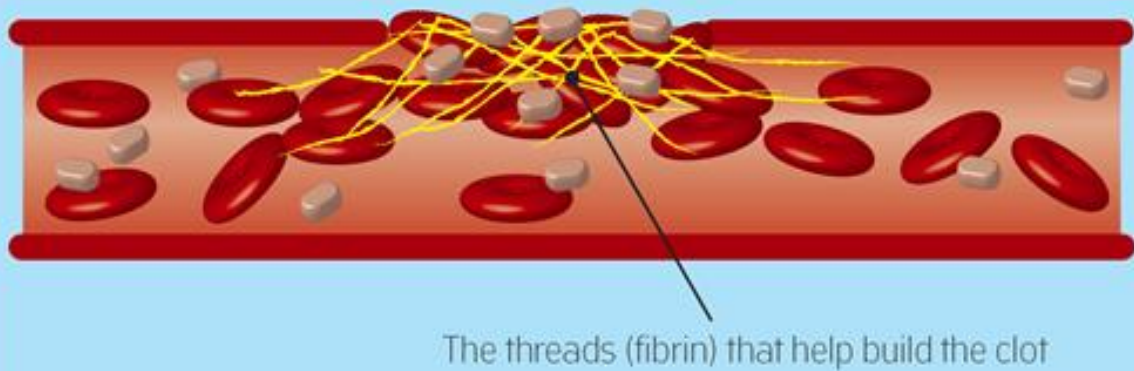


Formation of blood clots

1. Damaged blood vessel wall



2. Repaired vessel wall



Language of Anatomy

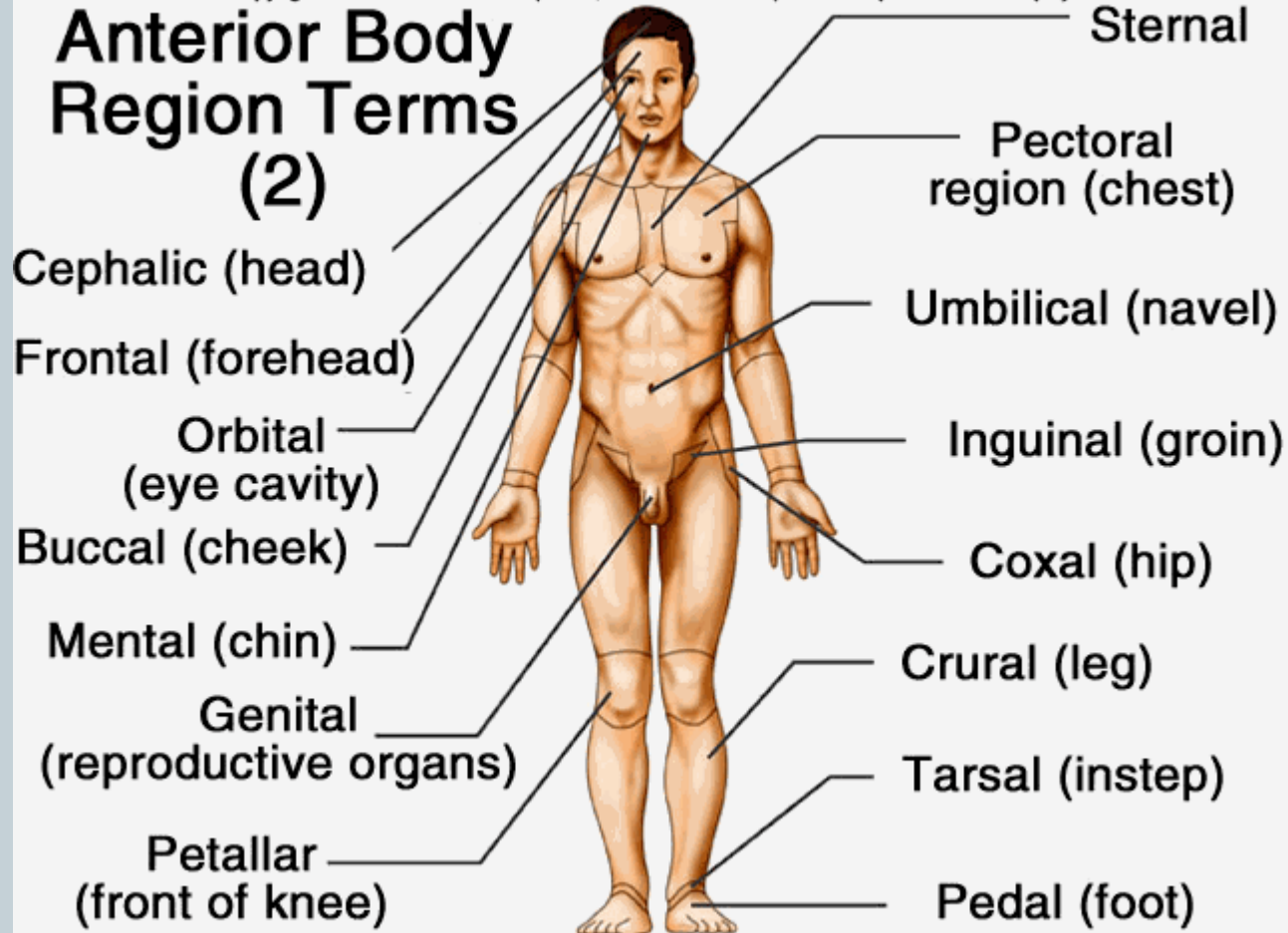
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Anterior (Front)

76

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Anterior Body Region Terms (2)

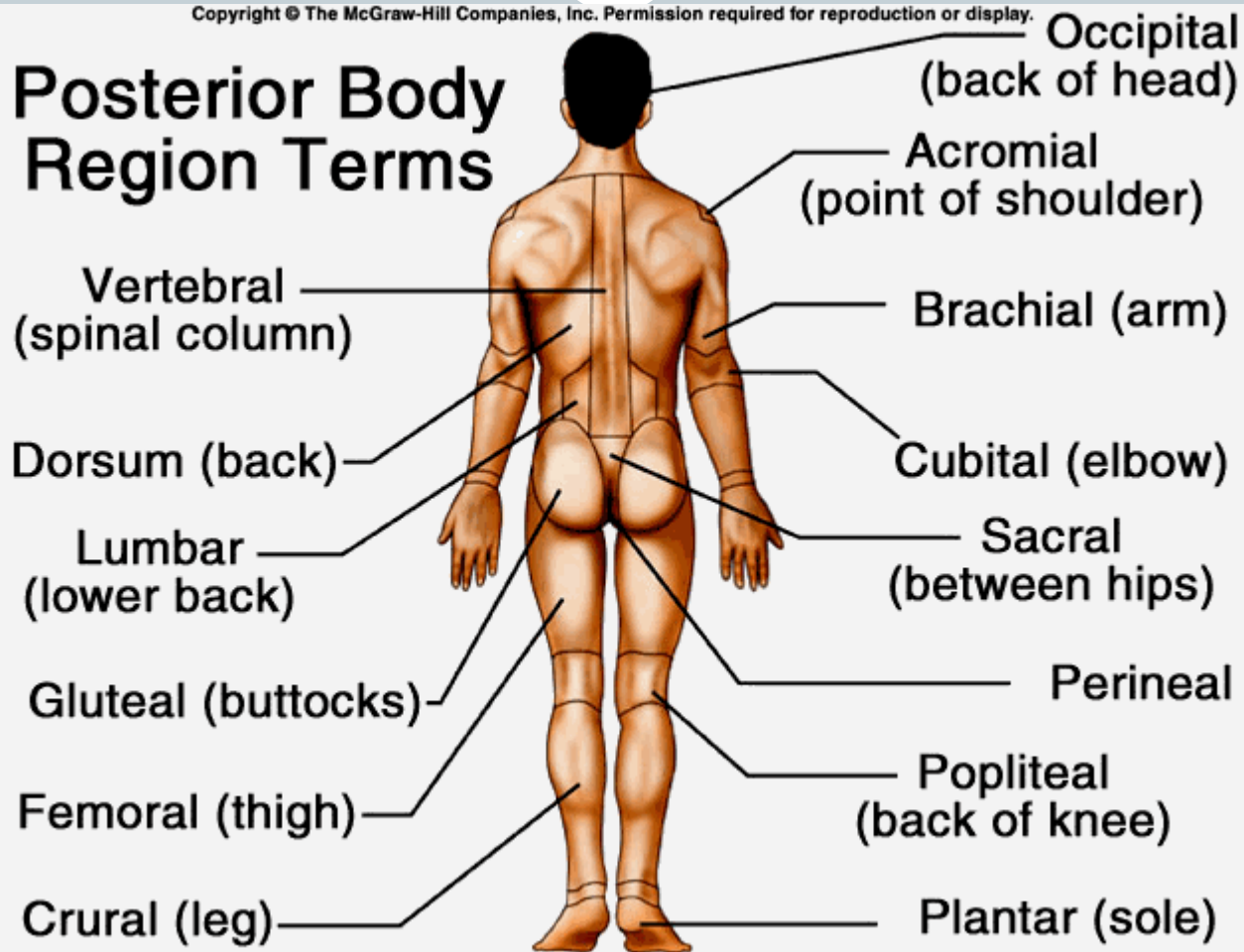


Posterior (Back)

77

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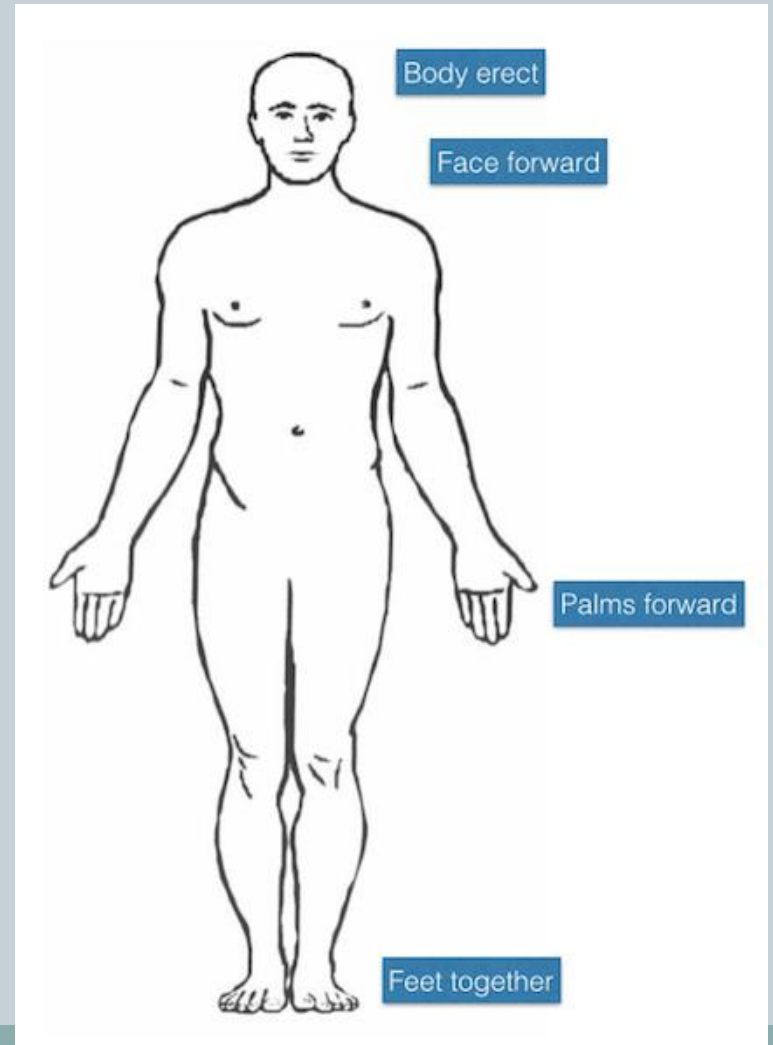
Posterior Body Region Terms



Anatomical Position

78

- Facing forward
- Palms face forward
- Arms and legs are parallel

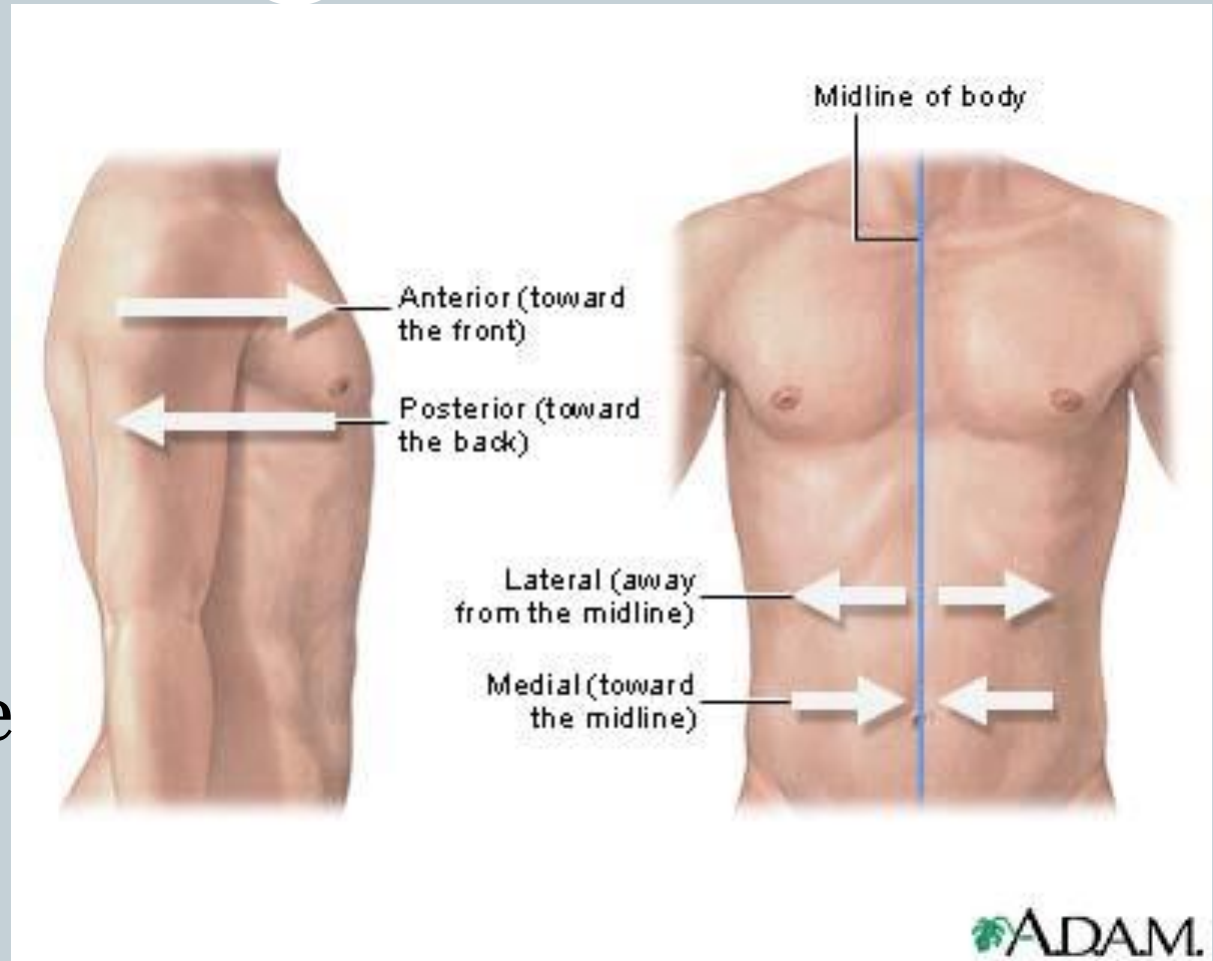


Medial and Lateral

79

Medial-towards
the midline
(AKA-in the
middle)

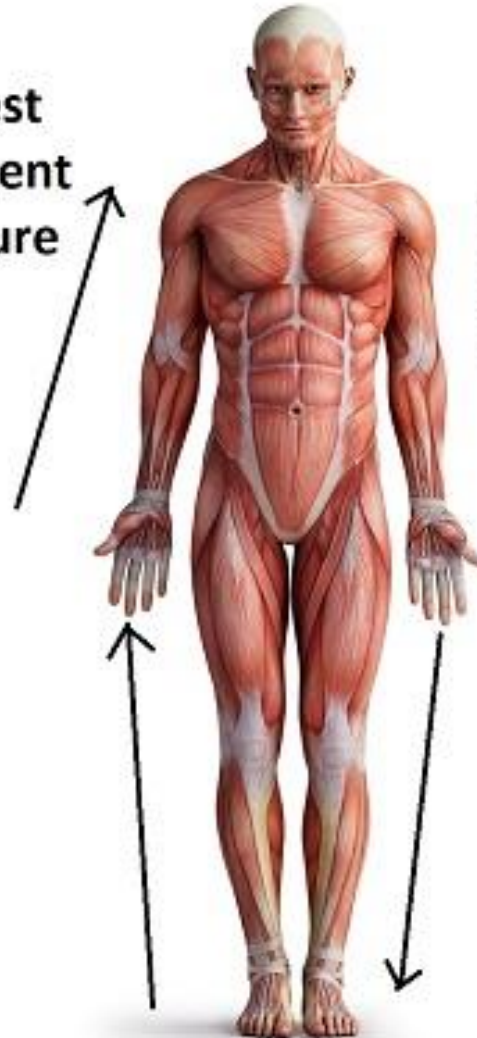
Lateral-away
from the midline
(AKA-on the
sides)



Distal vs Proximal

80

**Proximal = nearest
point of attachment
to limb or structure**

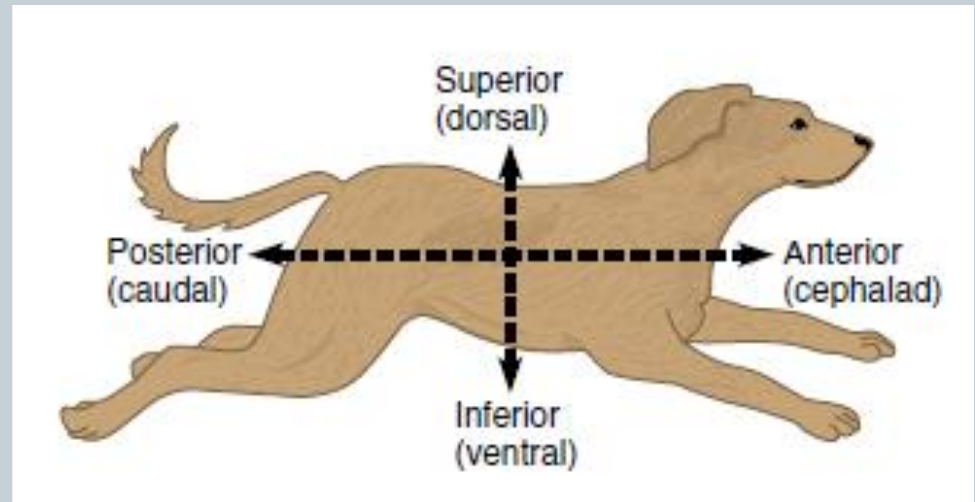
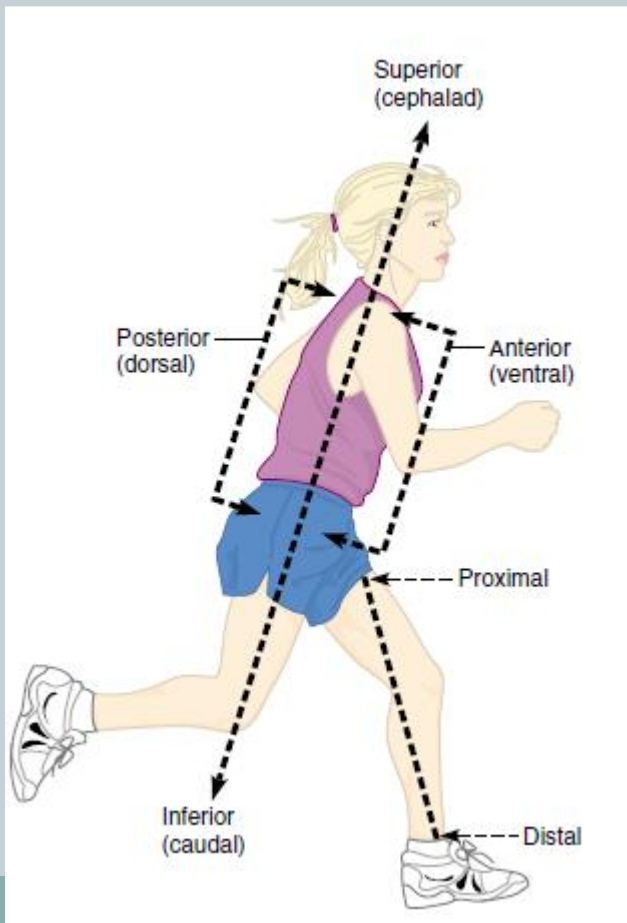


**Distal = farthest away
from attachment or
origin**

2 Legs vs. 4 Legs



The top of an organism is considered superior and the bottom is considered inferior.



Let's Practice

82

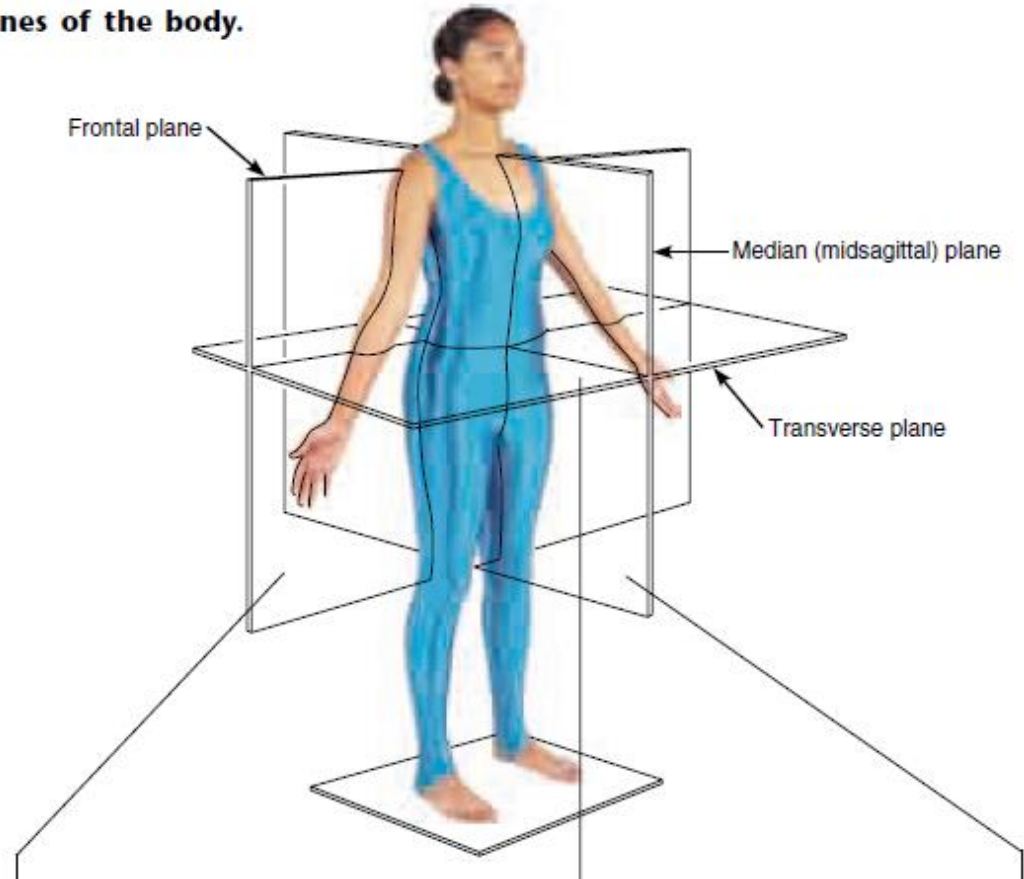
- Your feet are _____ to your knees
- The front of your body is _____
- Your nose is _____ to your eyes
- Your head is _____ to your feet.

Planes of the Body



Frontal-A front and a back. One side you will see your face and the other side you will see your butt.

Planes of the body.

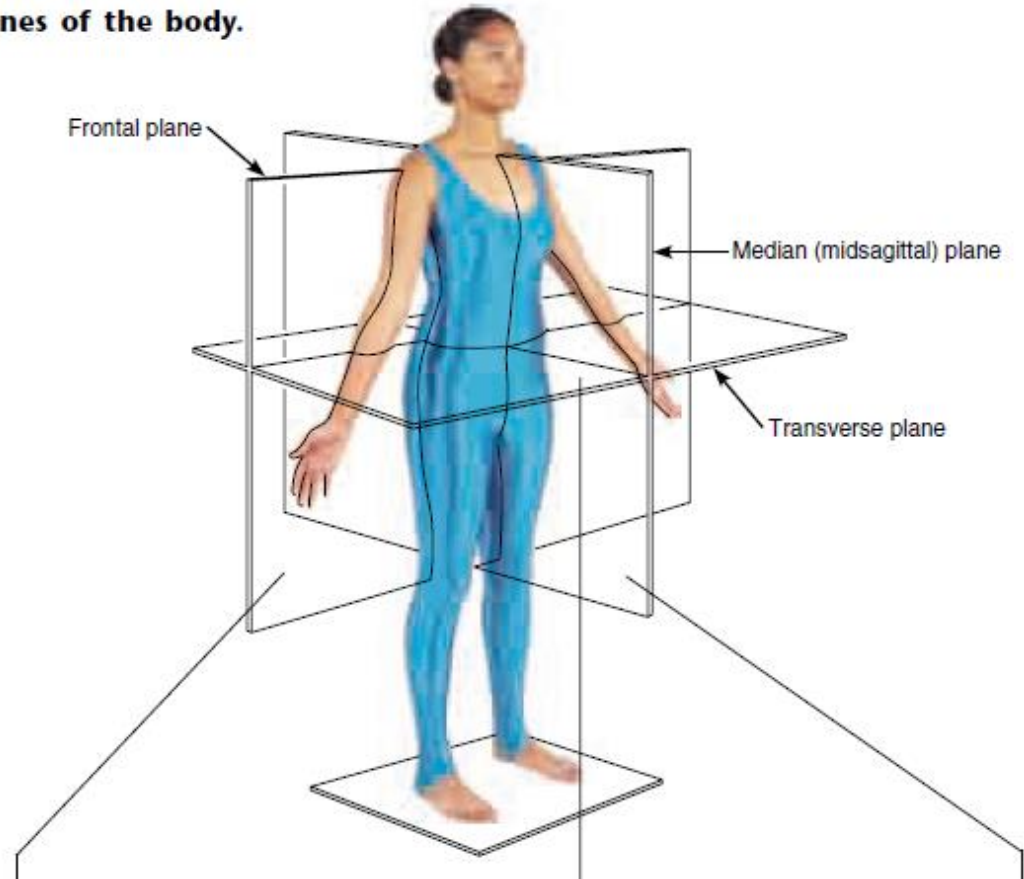


Planes of the Body



Transverse-A top and a bottom. One side you will see your head and the other side you will see your feet.

Planes of the body.

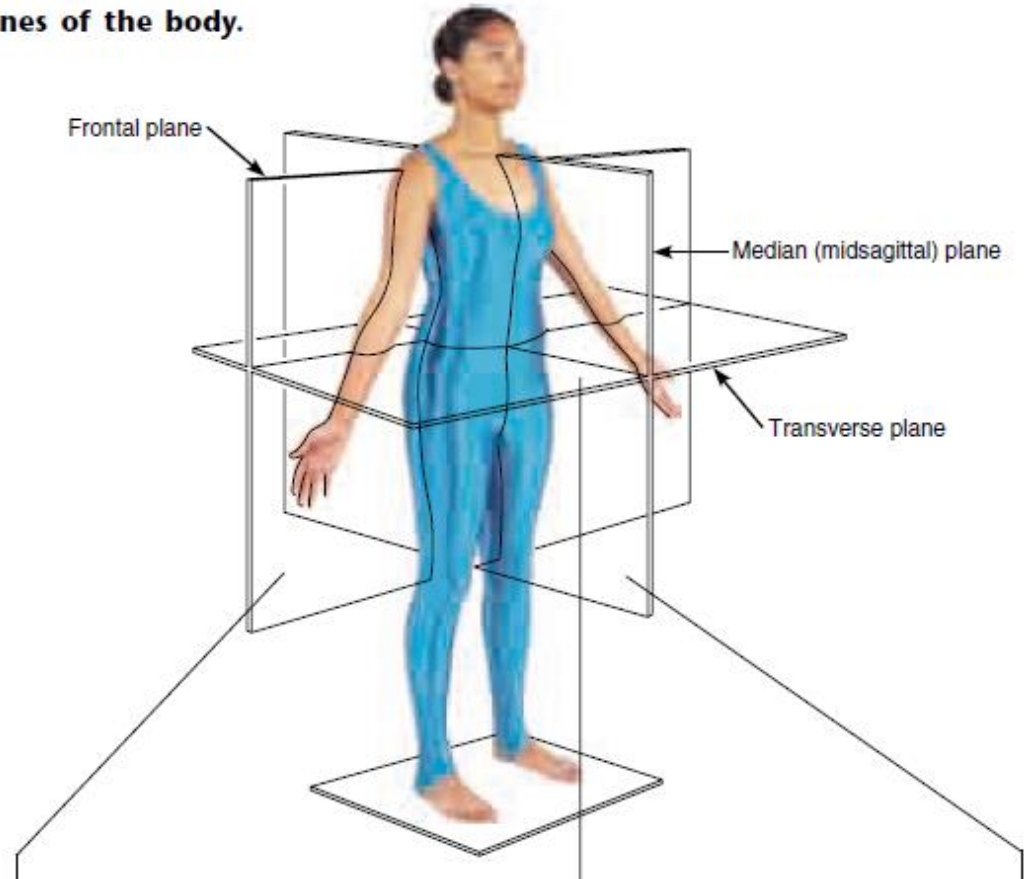


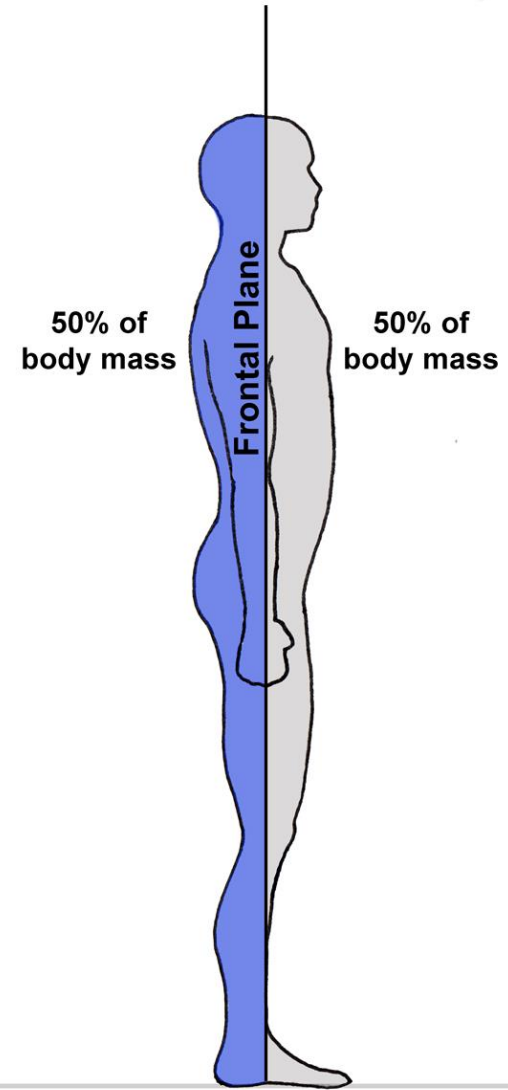
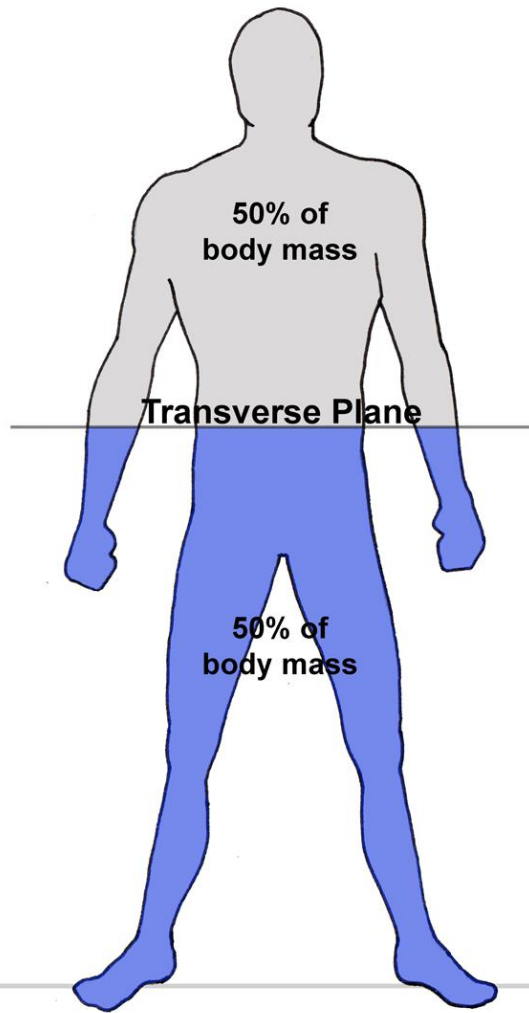
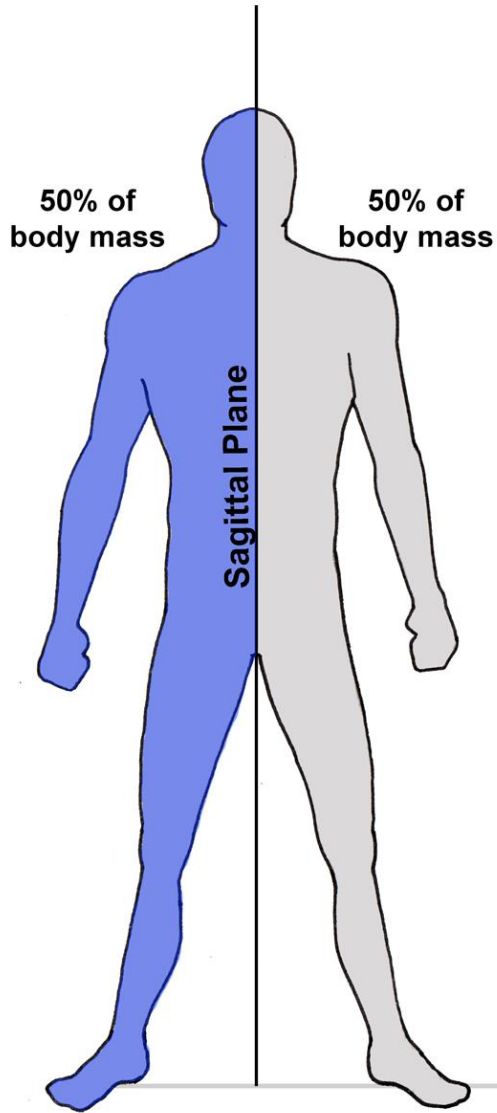
Planes of the Body



Midsagittal-A left and a right. One side will be your right-hand side and the other will be your left-hand side.

Planes of the body.





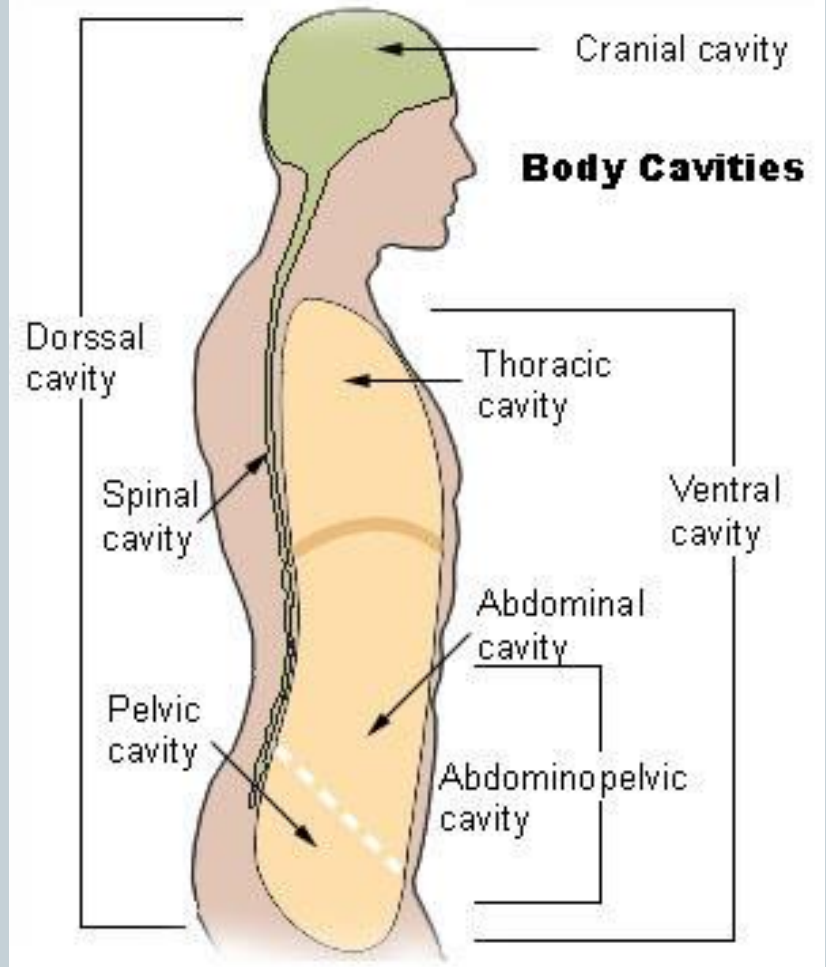
Body Cavities

87

Dorsal Body Cavities

88

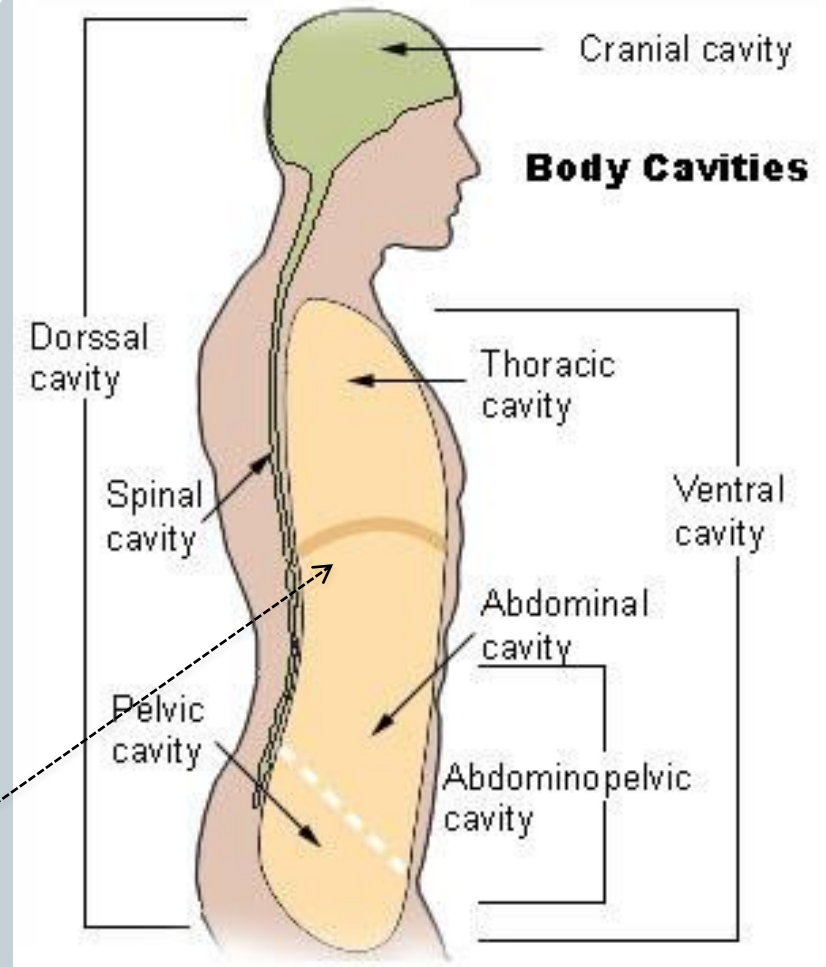
- Cranial Cavity contains the brain inside of a bony skull.
- Spinal Cavity contains the spinal cord protected by vertebrae.
- Both dorsal cavities are surrounded by bone to protect the internal structures.



Ventral Body Cavities

89

- Thoracic cavity contains the heart and lungs protected by the ribs.
- Abdominal cavity contains the stomach, liver and intestines.
- The pelvic cavity contains the bladder and reproductive organs of the female.



Abdominopelvic Cavity

90

- The distinction between the abdominal and pelvic cavities can sometimes be tricky. So to avoid confusion, we will refer to them collectively as the abdominopelvic cavity.
- The thoracic and abdominopelvic cavities are separated by a muscle called the diaphragm.

