Period 1- AP
9/7/16

Do Now:

1. Please sit in the same seat as yesterday
2. Take out your **signed syllabus,** remove the second page

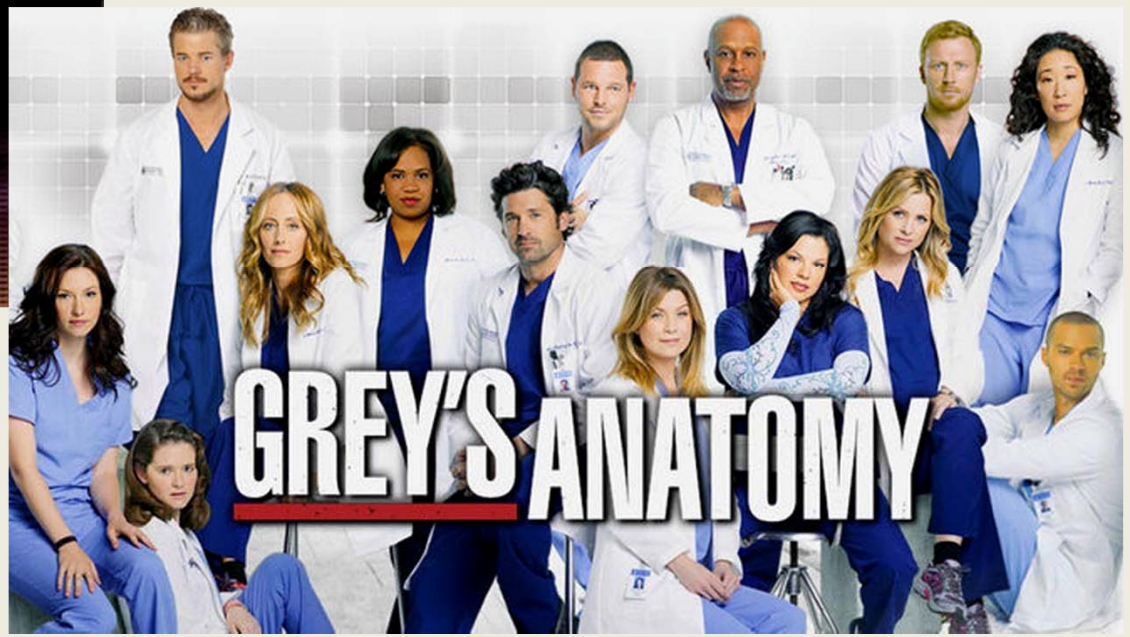
Aim #3: What is anatomy and physiology?

Homework: None for tonight ☺

Chapter 1

HUMAN BODY: AN ORIENTATION

What is Anatomy?



Anatomy

- 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.

Herophilus

- Greek physician
- Alexandria
- 335 BC
- Brain > Heart

- “vivisection”

Where does the term “anatomy” come from?

“ANA” + “TOMY”

(apart) (cut)

Physiology

- 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.

Anatomy? Or Physiology?

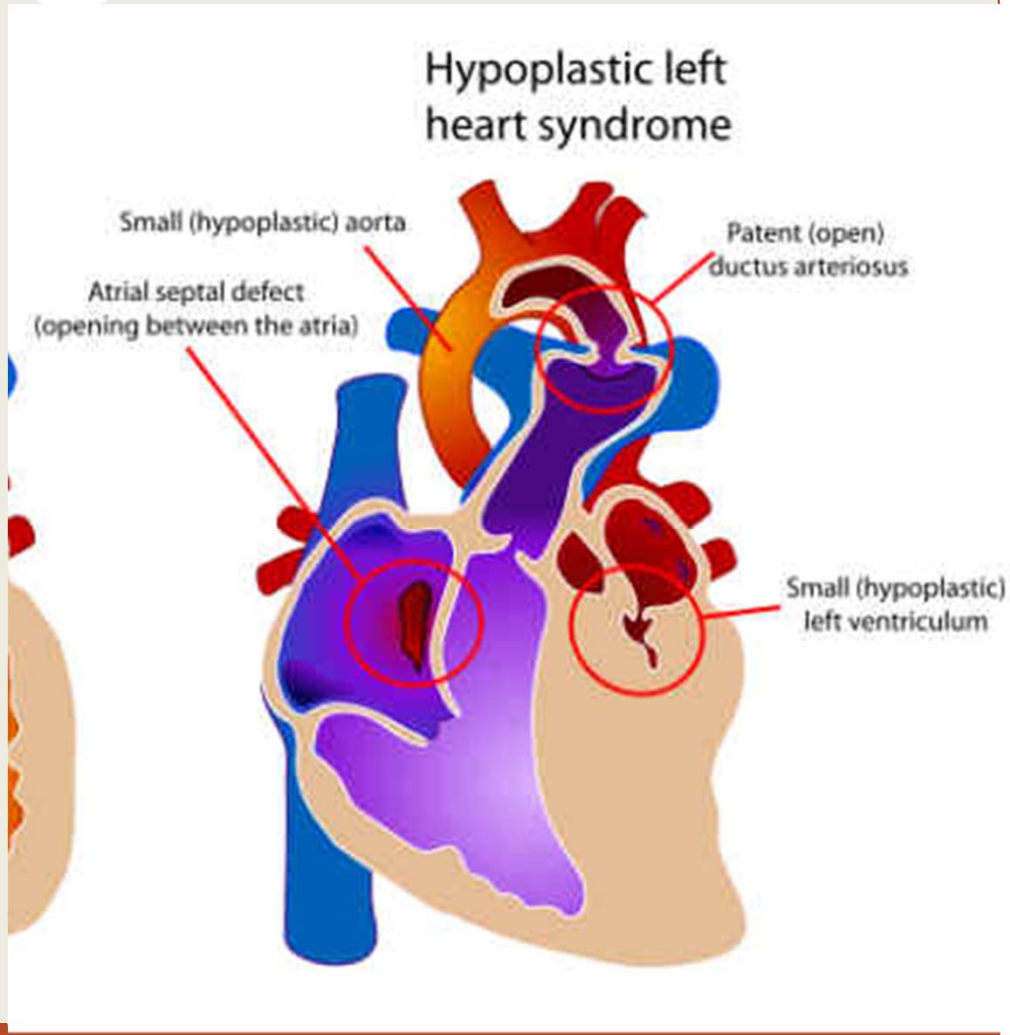
Understanding how the muscle fibers of Usain Bolt allow him to be “the fastest man alive”

Anatomy? Or Physiology?

Medical students conducting an autopsy on a body donated to science

Anatomy? Or Physiology?

Studying the function of a hypoplastic left heart



How are living things organized?

Try to put these in order from smallest → largest

Cell

Organ

Tissue

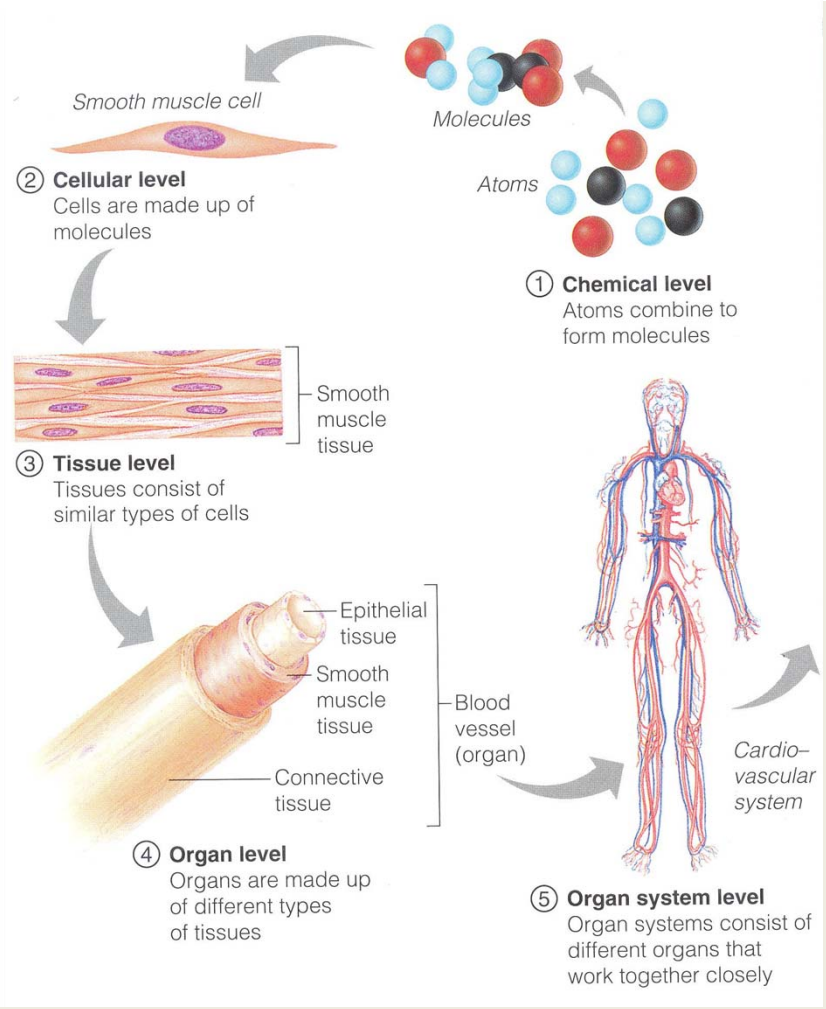
Organism

Organ System

Atom

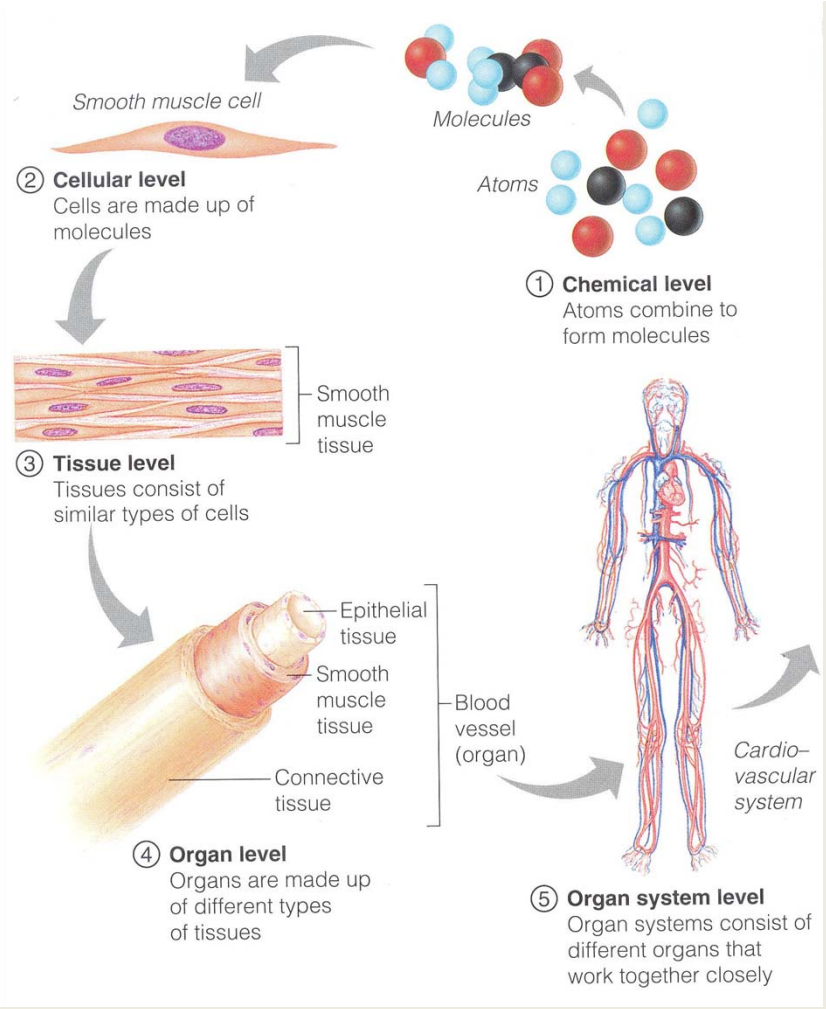
Levels of Structural Organization

- Atoms-The simplest level of organization or the chemical level.
- Cells-The smallest unit of living things.

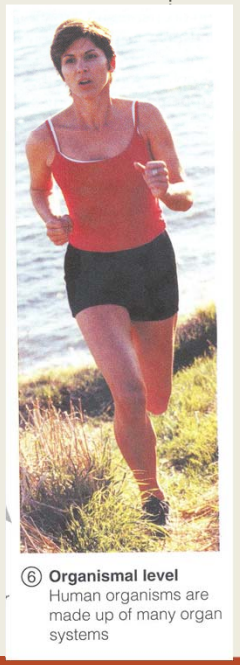


- Tissues-Collections of cells with a common function.
- Organs-Composed of two or more tissue types.

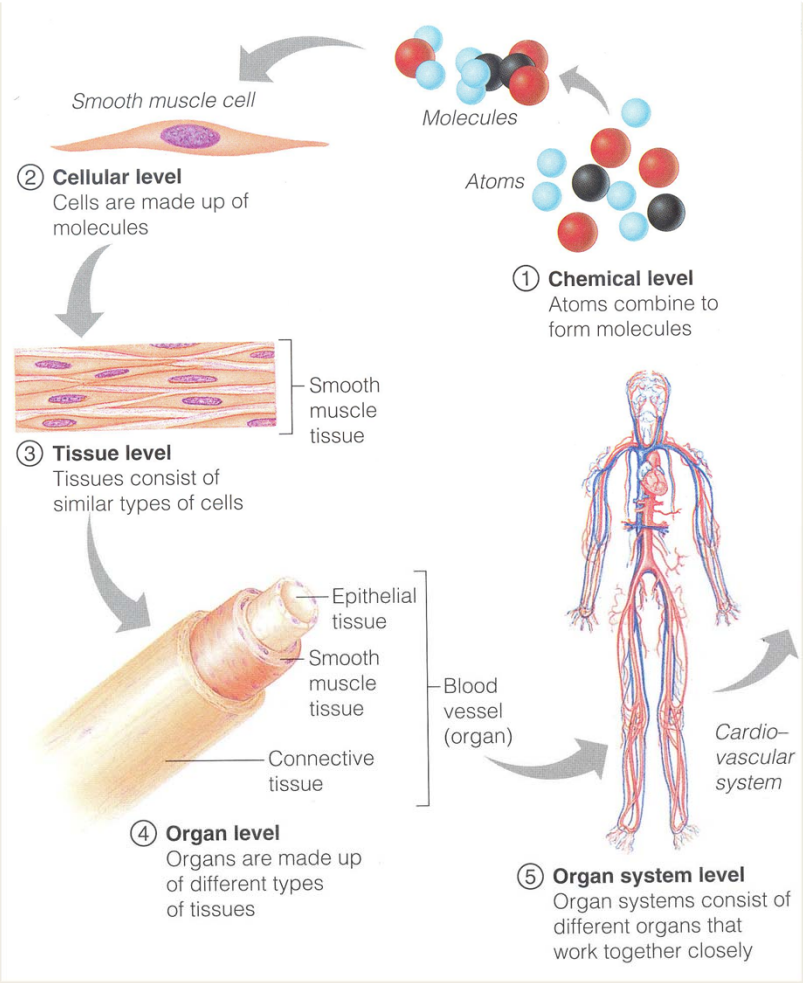
Stomach – epithelial (skin) muscle



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



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

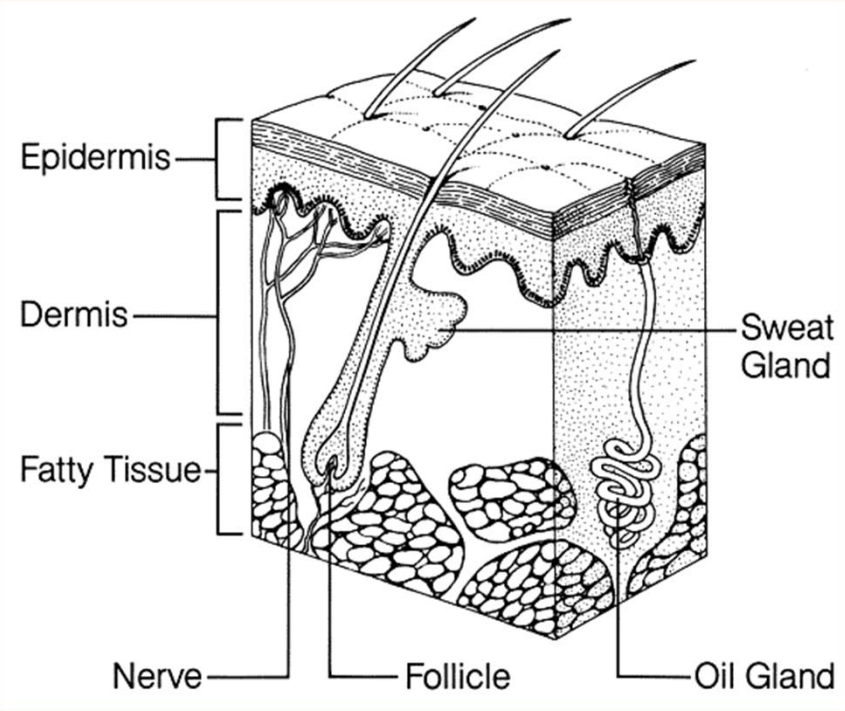


Organ System Overview

How many "systems" do we have?

Integumentary System

- 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.



Period 1- AP
9/8/16

Do Now:

1. Locate and take out your notes

Aim #4: What are the main body systems and what do they do?

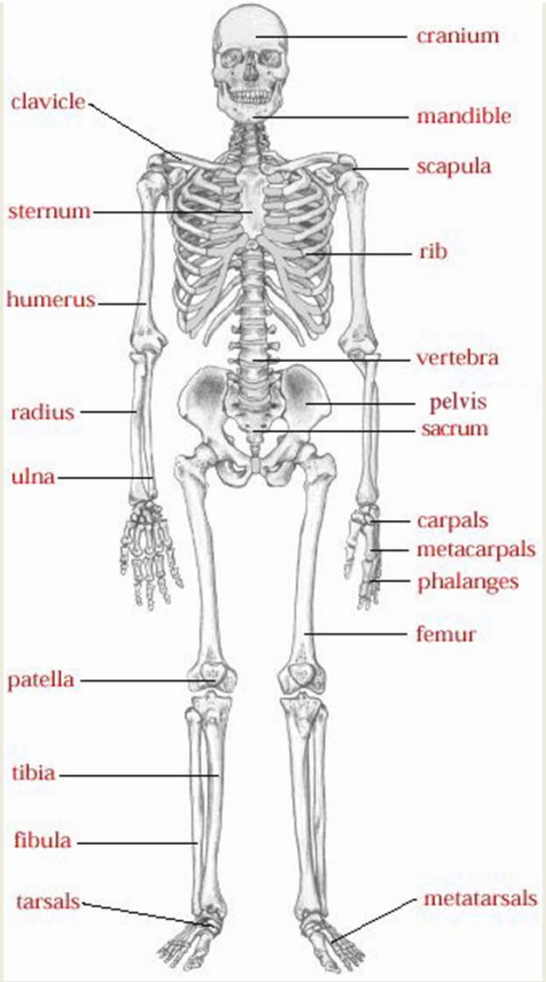
Homework:

How much space would our skin take up if we laid it out flat?

- About 16-21 ft squared!

Skeletal System

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



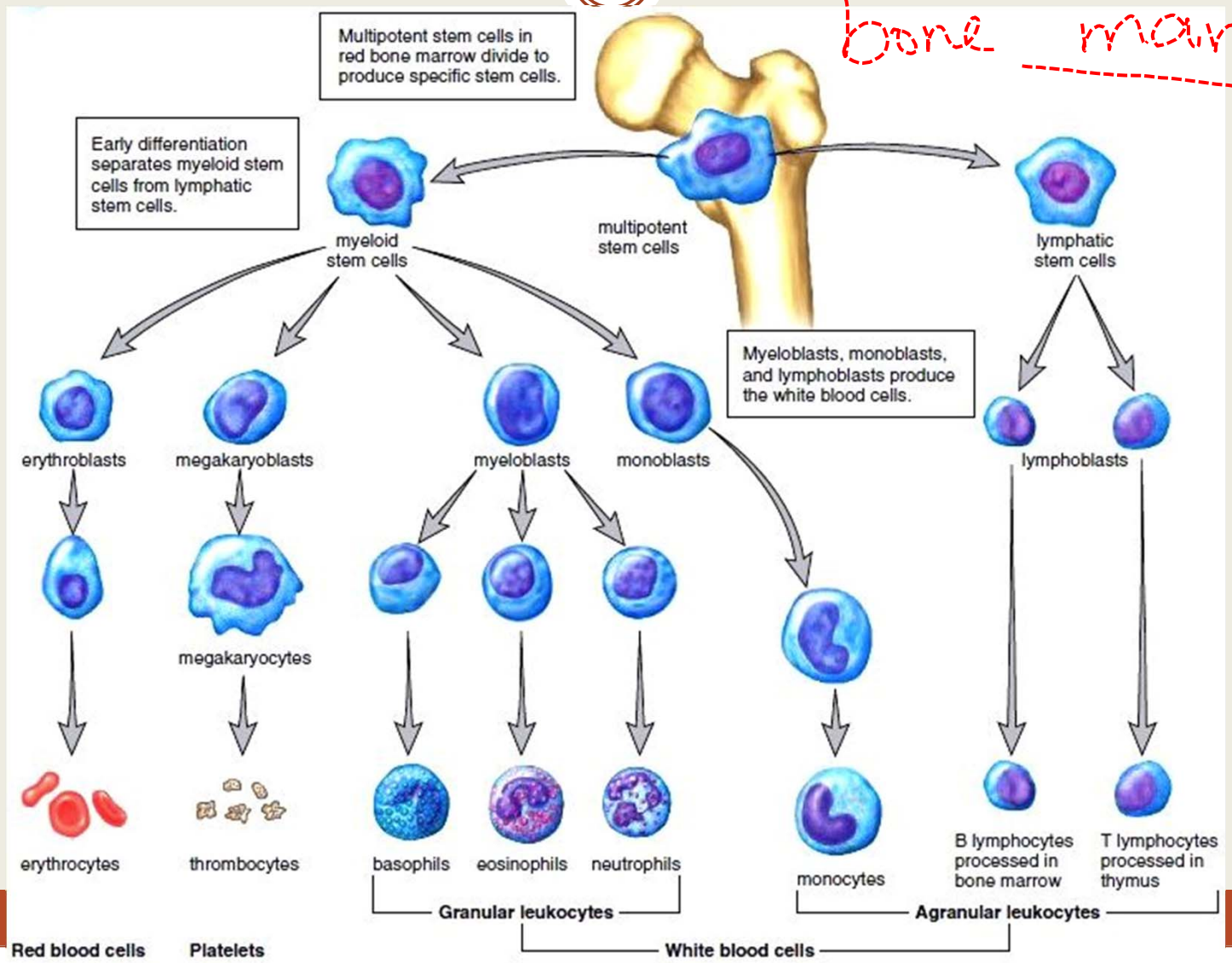
How many bones?

- 260 → 206

Hemopoiesis

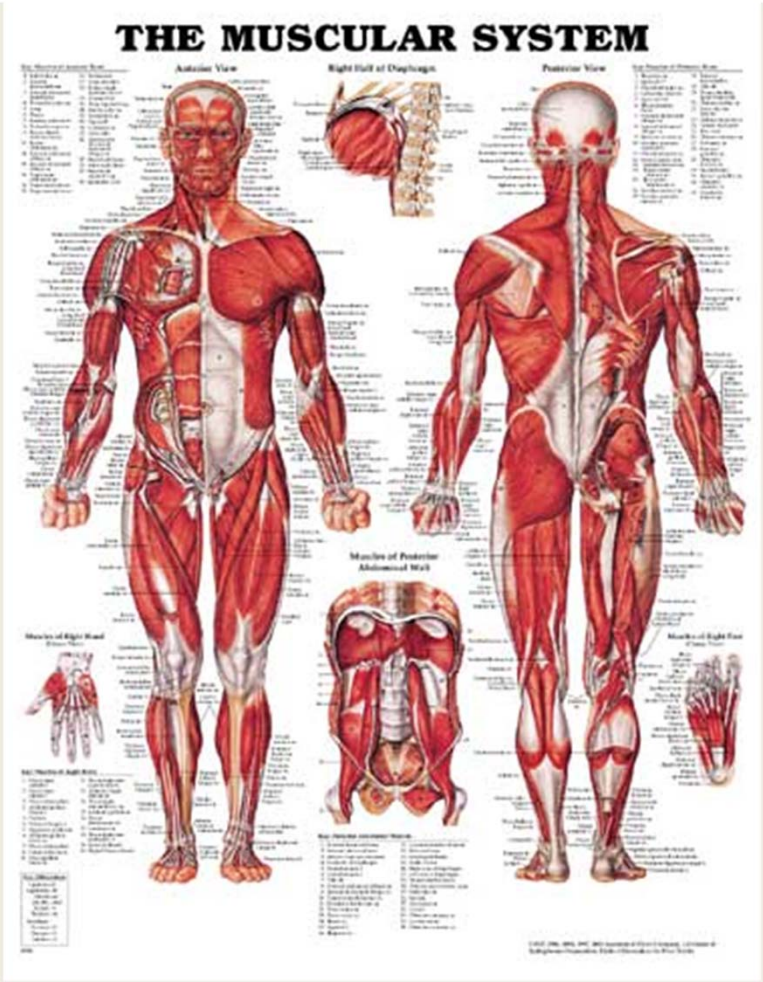
bones producing blood

bone marrow



Muscular System

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



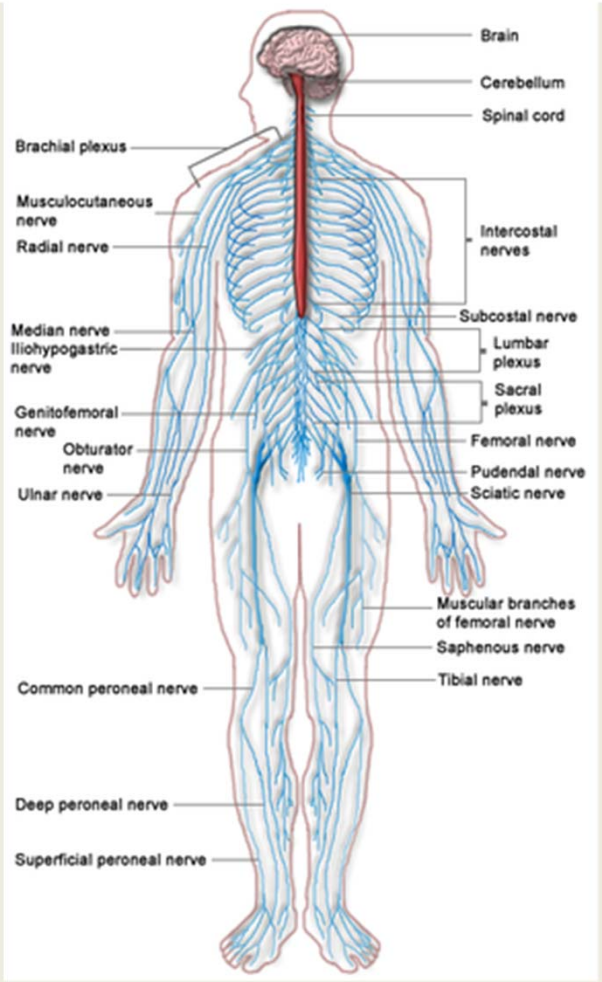
How many muscles?

650-840

https://www.youtube.com/watch?v=dxQmOR_QLfQ

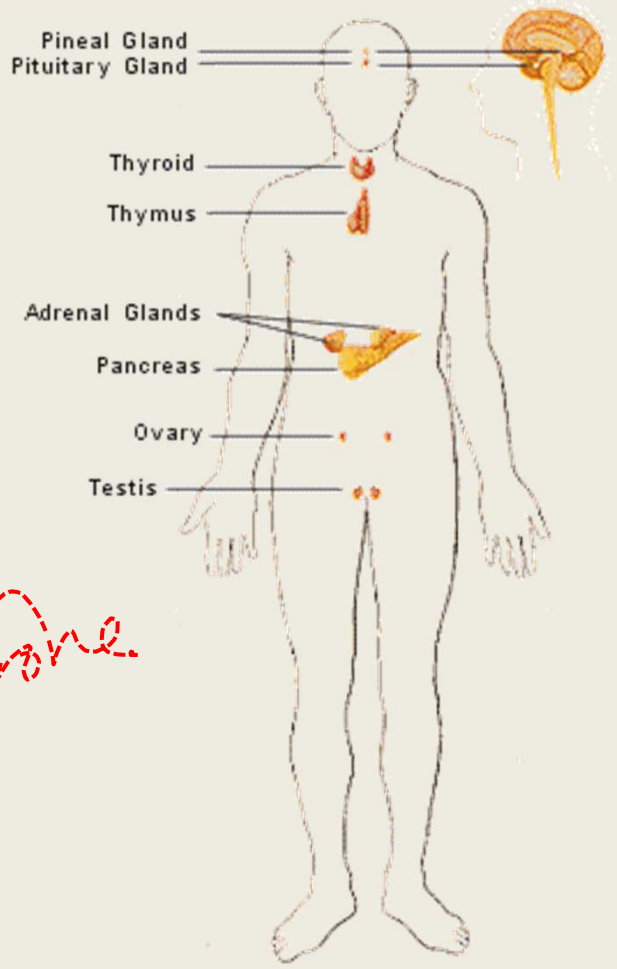
Nervous System

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



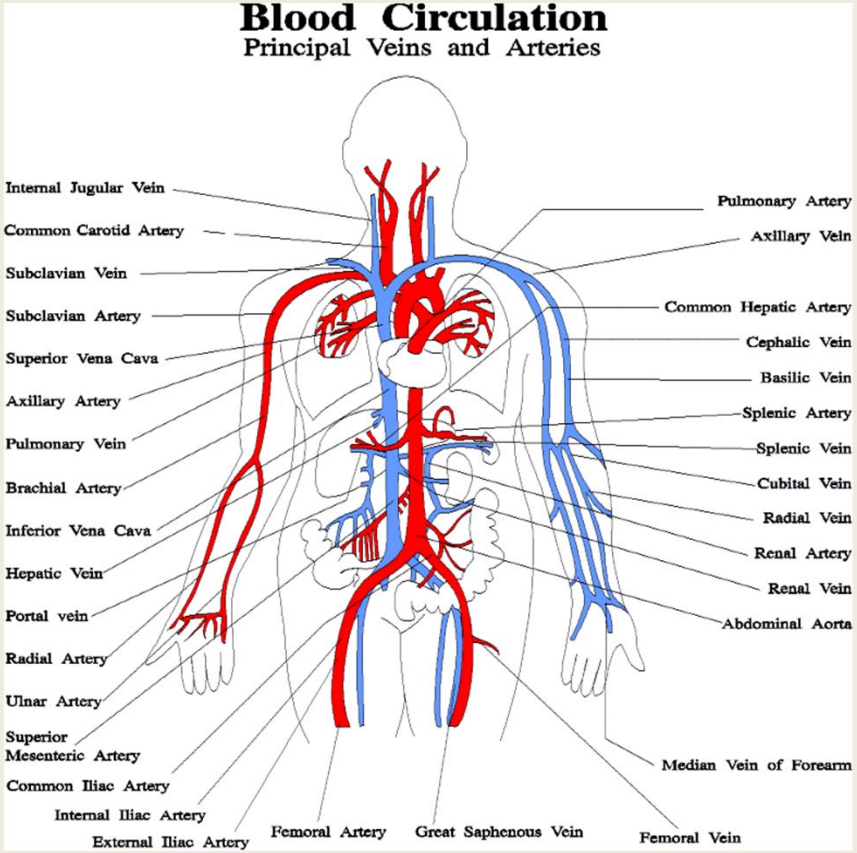
Endocrine System

- 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**.



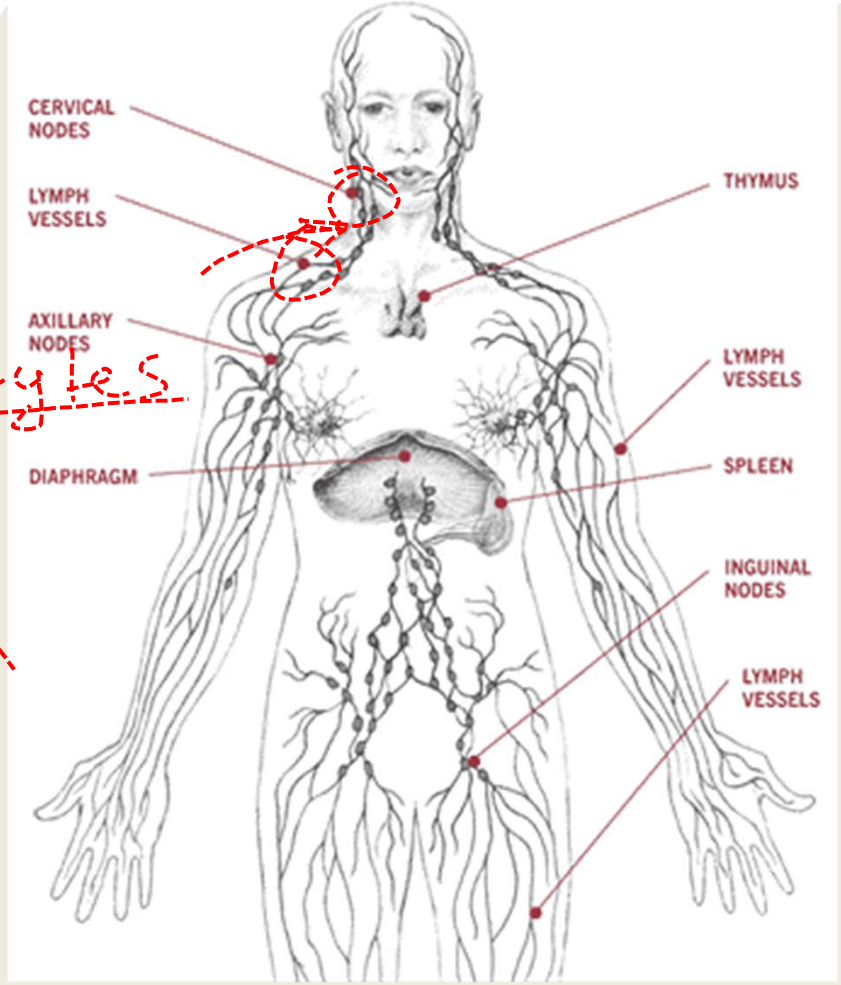
Cardiovascular System

- 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

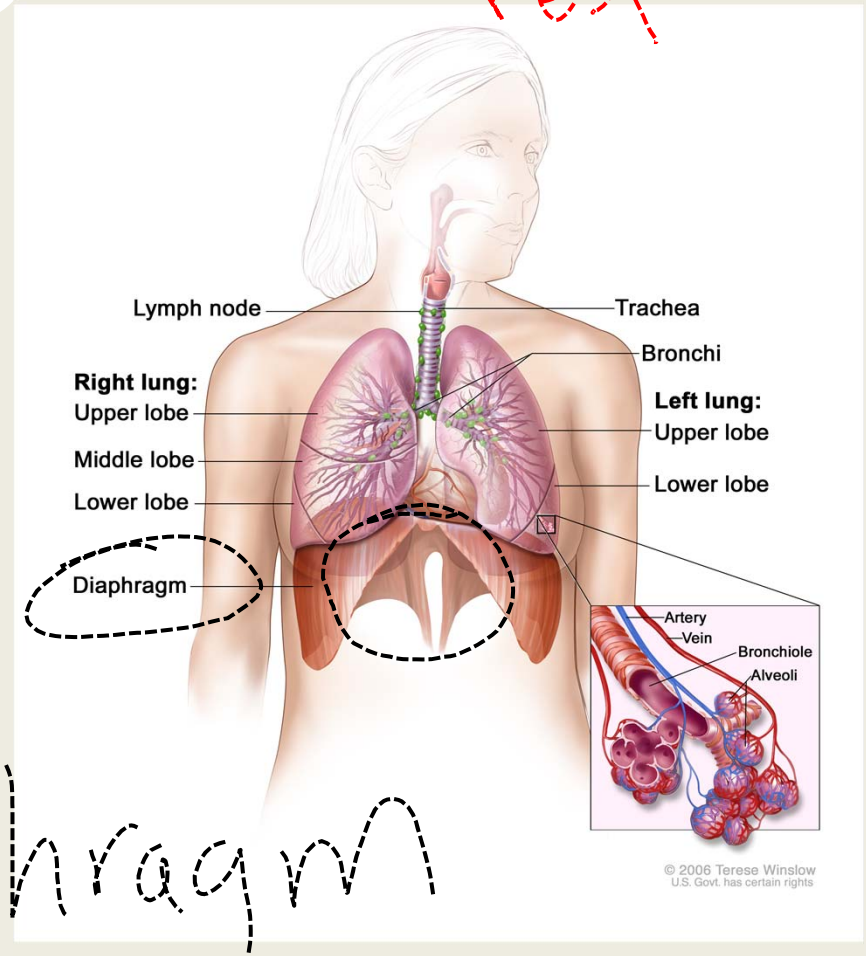
- Picks up fluid leaked from blood vessels and returns it to the blood.
- Houses white blood cells involved in immunity.
- Destroys bacteria and tumor cells.



Respiratory System

cellular respiration

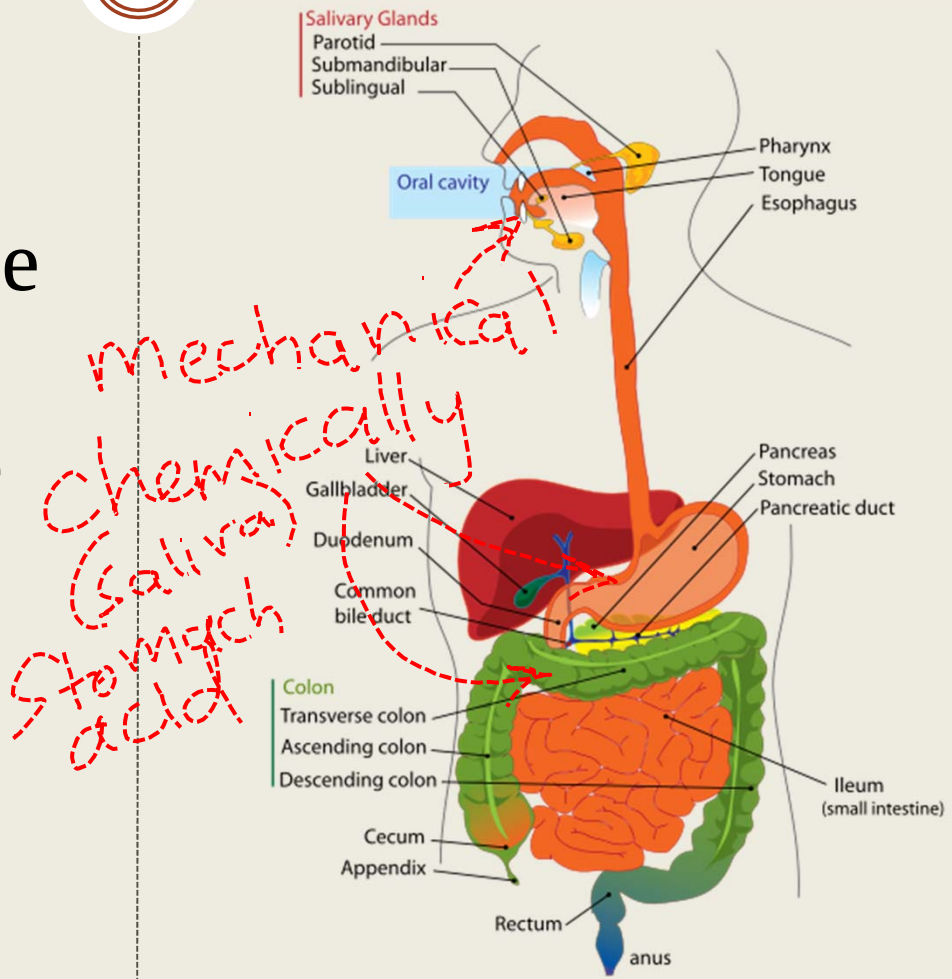
- Keeps blood constantly supplied with oxygen and removes carbon dioxide which occurs in the lungs.



Diaphragm

Digestive System

- Breaks food down into absorbable units that enter the blood for distribution to the body.



Period 1- A and P
9/11/16

Do Now:

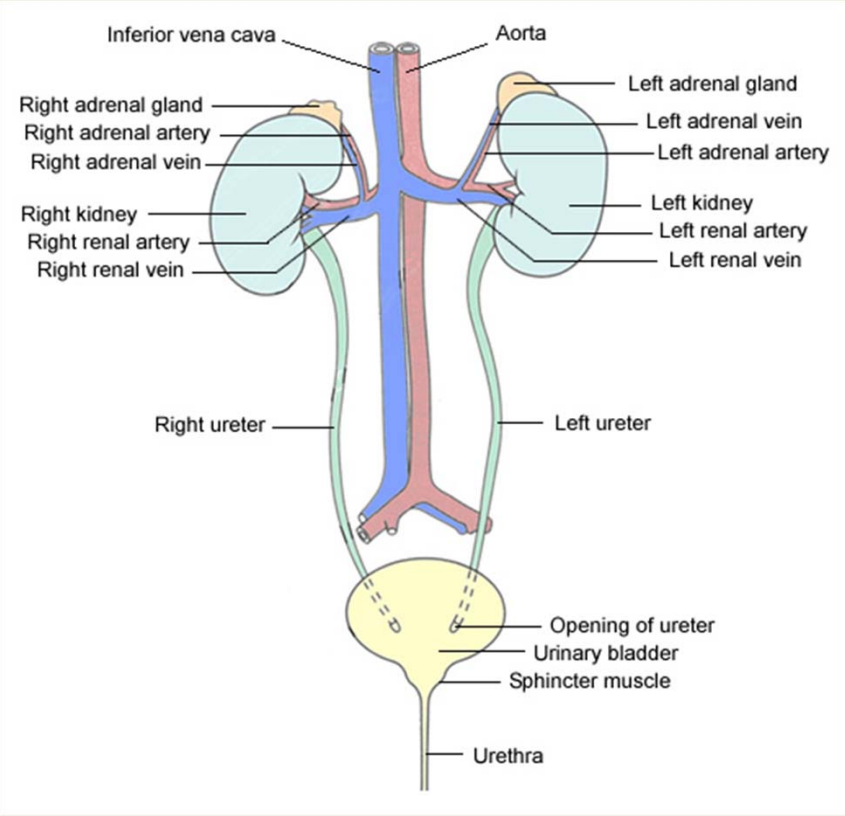
1. Take out notes
2. Think about this – Is it bad to hold your pee?

Aim #4: What are the main body systems and what do they do?

Homework: Questions 1 and 2 in packet

Urinary System

- Eliminates **nitrogenous** wastes from the body and regulates water.

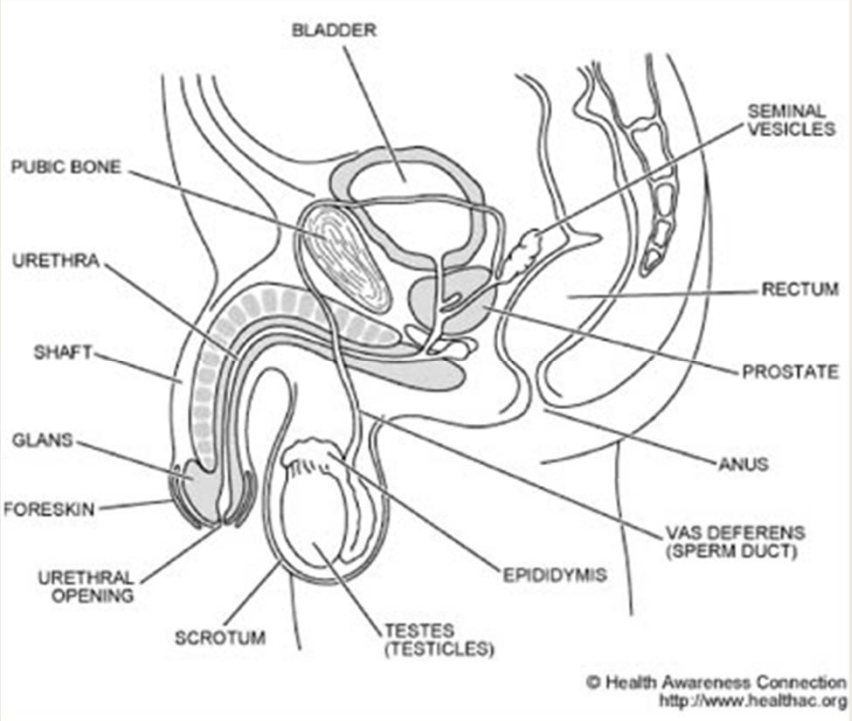


IS IT BAD TO HOLD YOUR PEE?

- https://www.youtube.com/watch?v=Ze4Qmpq48AQ

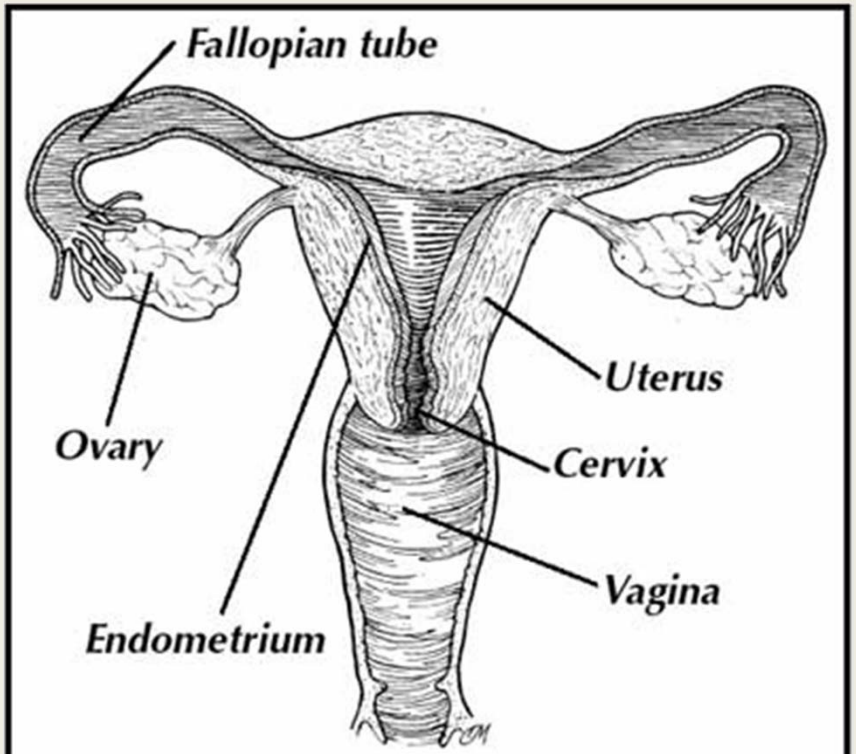
Male Reproductive System

- To produce offspring.
- Testes produce sperm and male sex hormones.



Female Reproductive System

- 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.

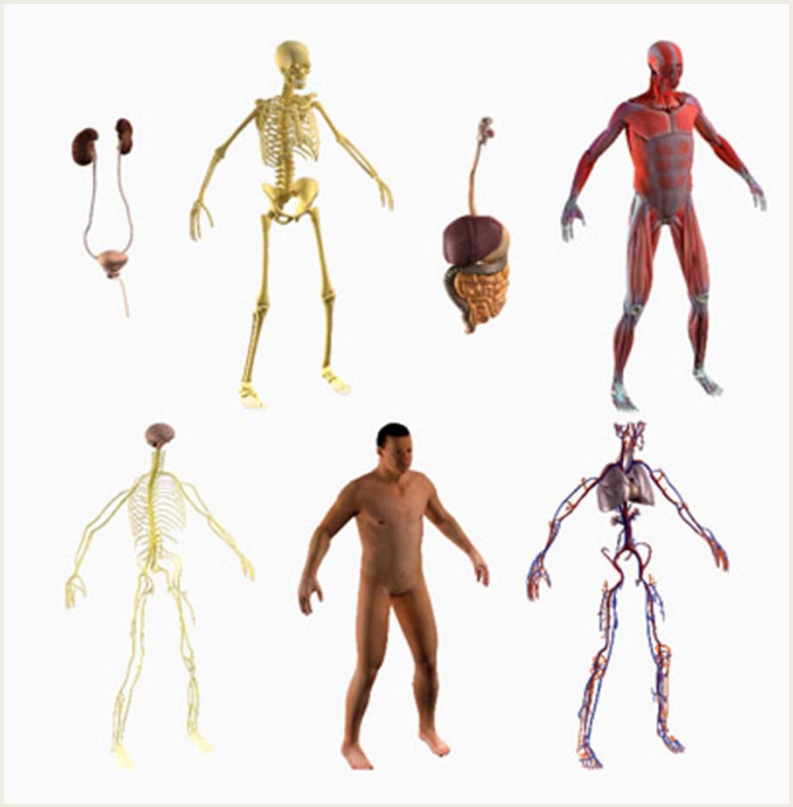


A front view of the female reproductive organs.

Maintaining Life

Maintenance of Boundaries

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



Movement

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

Responsiveness

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

Digestion

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

Metabolism

- All chemical reactions that occur within body cells.
- Breaks down complex molecules into smaller ones and makes larger molecules from smaller ones.
- Uses nutrients and oxygen to produce ATP.
- Regulated by hormones secreted by the glands of the endocrine system.

Period 1- A and P
9/12/16

Do Now:

1. Take out notes **AND HOMEWORK**
2. We are finishing up maintaining life AND survival needs TODAY

Aim #5: What do humans need to survive?

Homework: Meet in the library tomorrow morning

Packet- questions 3/4

Excretion

- Elimination of carbon dioxide by the lungs and elimination of nitrogenous wastes by the kidneys.

Reproduction

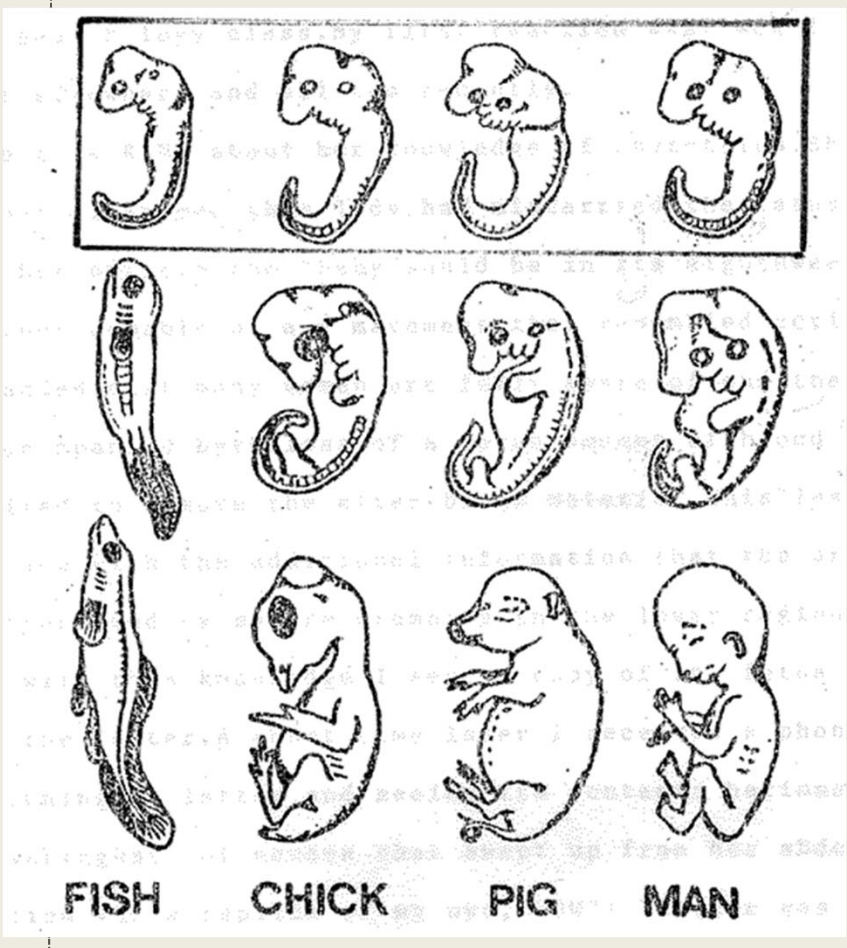
- Provides new cells for growth and repair.

Parthenogenesis

Starfish
Lizards

* Sexual
2 Parents
23 + 23

Asexual
1 Parent



Growth

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

Skin cells
→ stomach acid

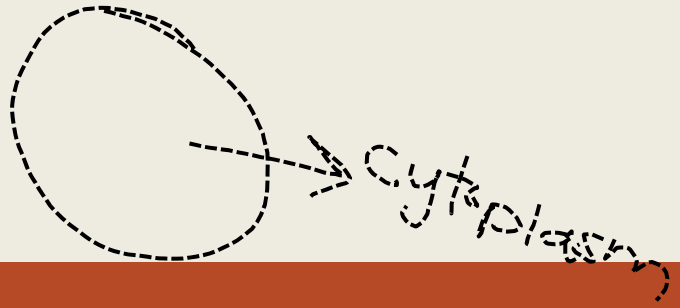
Survival Needs

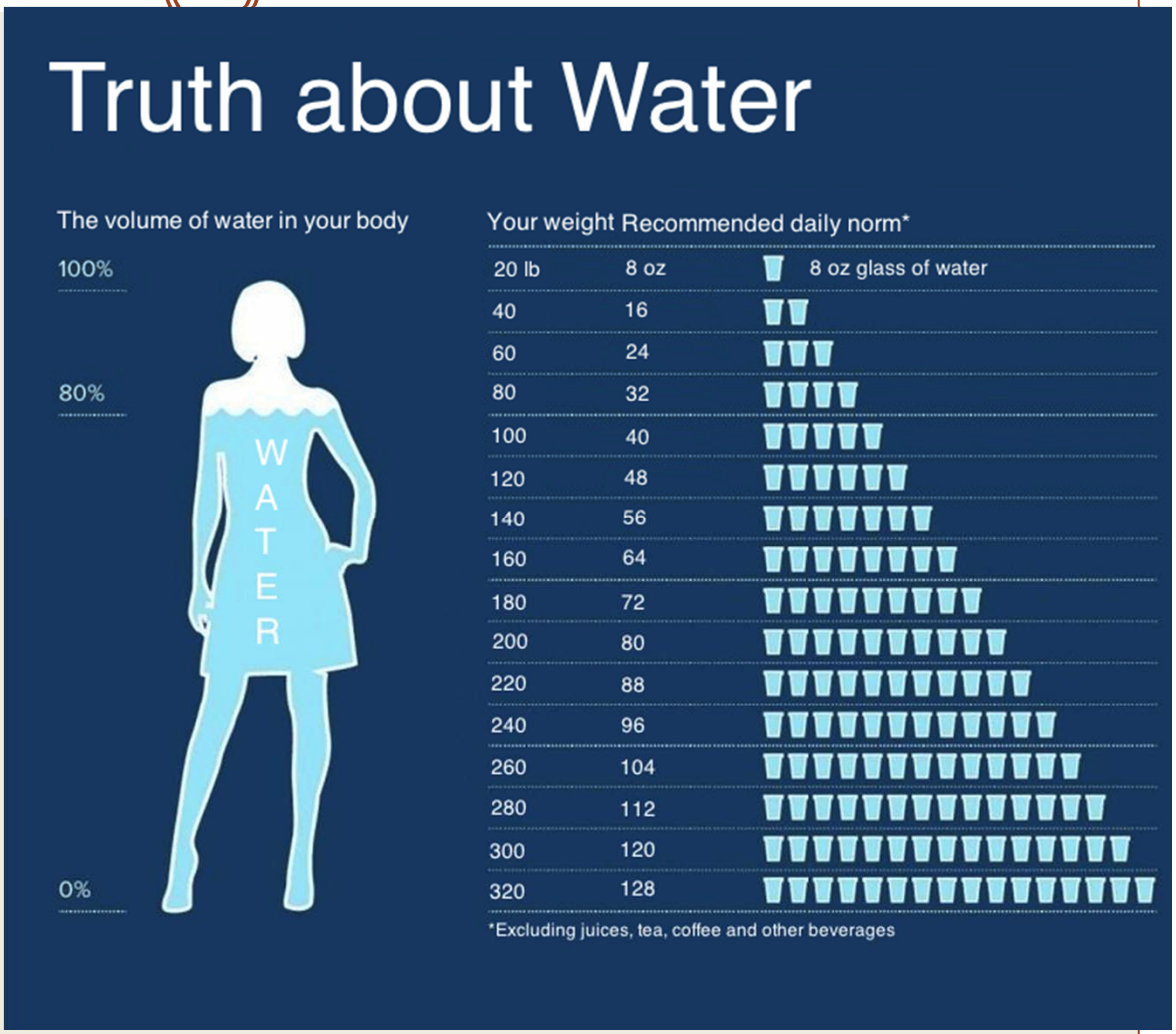
Nutrients

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

Water

- 60-80% of the body's weight.
- Provides the fluid base for body secretions and excretions.





Oxygen

- 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.

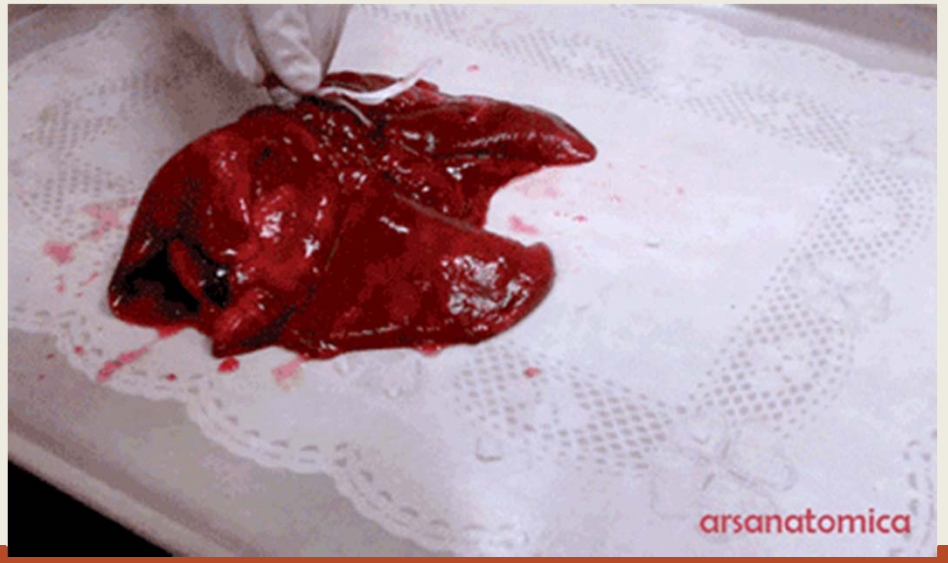
Body Temperature

- 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.

enzymes

Atmospheric Pressure

- Breathing depends on the pressure exerted on the body.
- If the altitude is too high (lower pressure) gas exchange may be to low to support metabolic activity.



Homeostasis

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

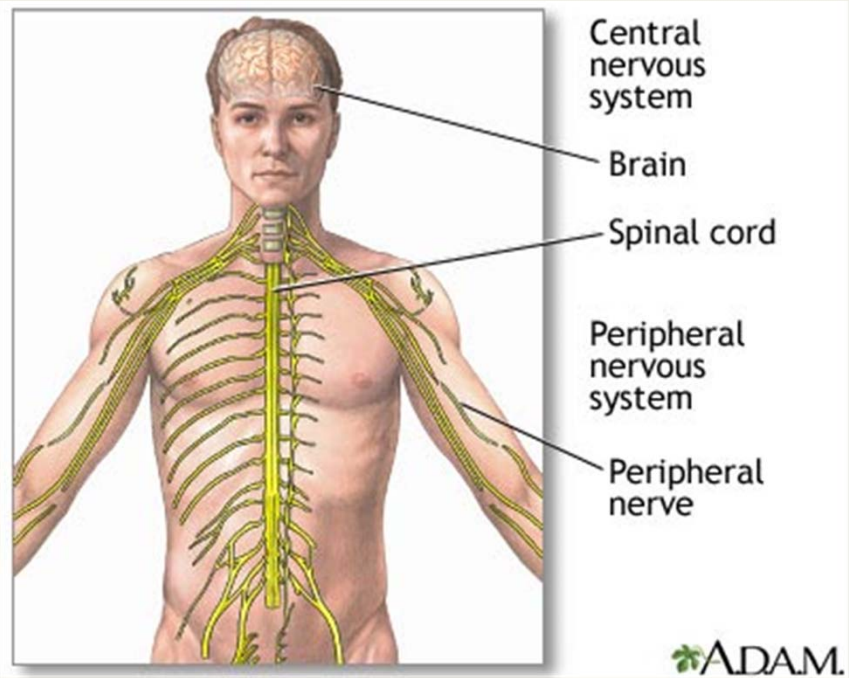
https://www.youtube.com/watch?v=Iz0Q9nTZCw4

Homeostatic Control Mechanisms

- 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.

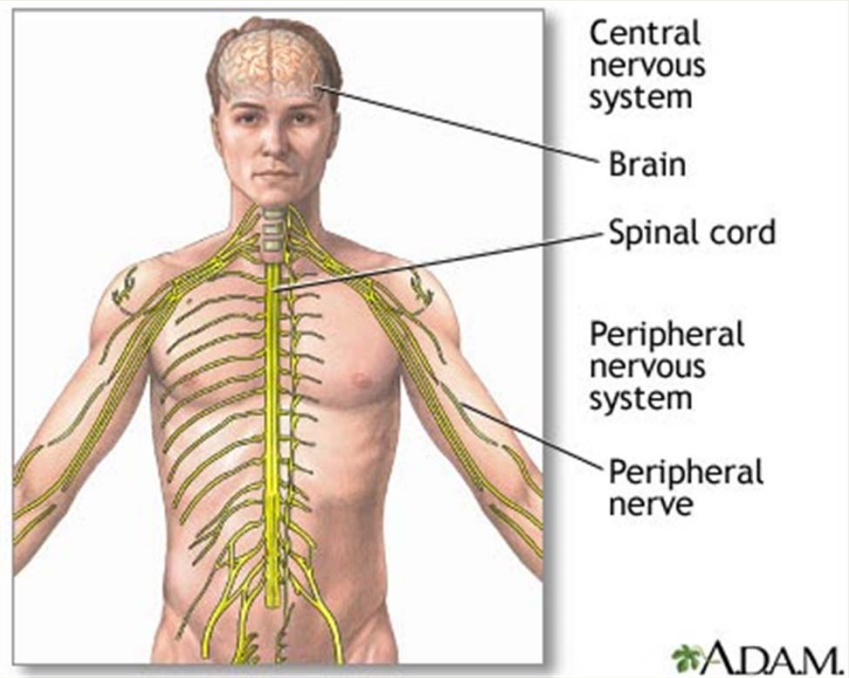
Receptor

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



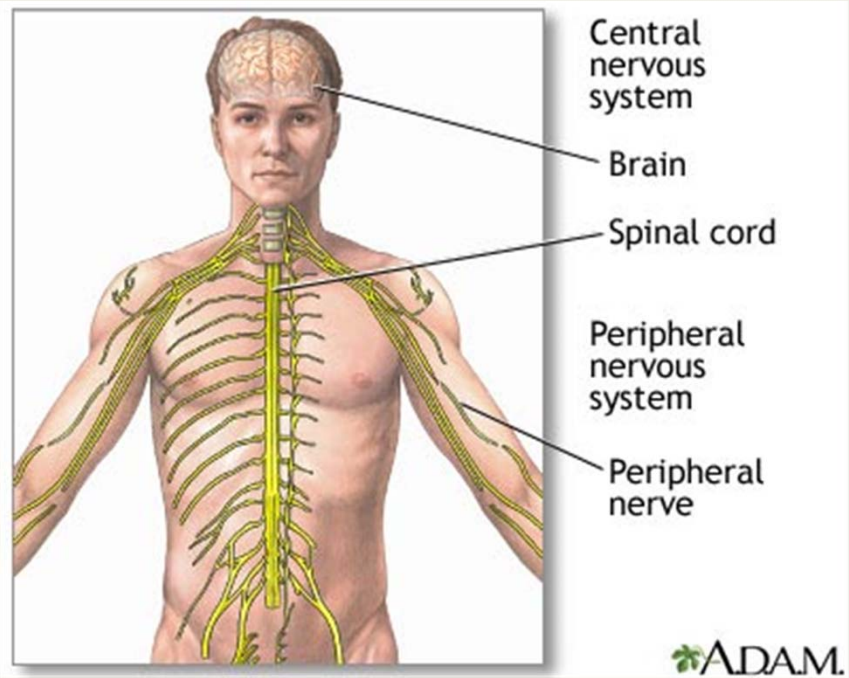
Control Center

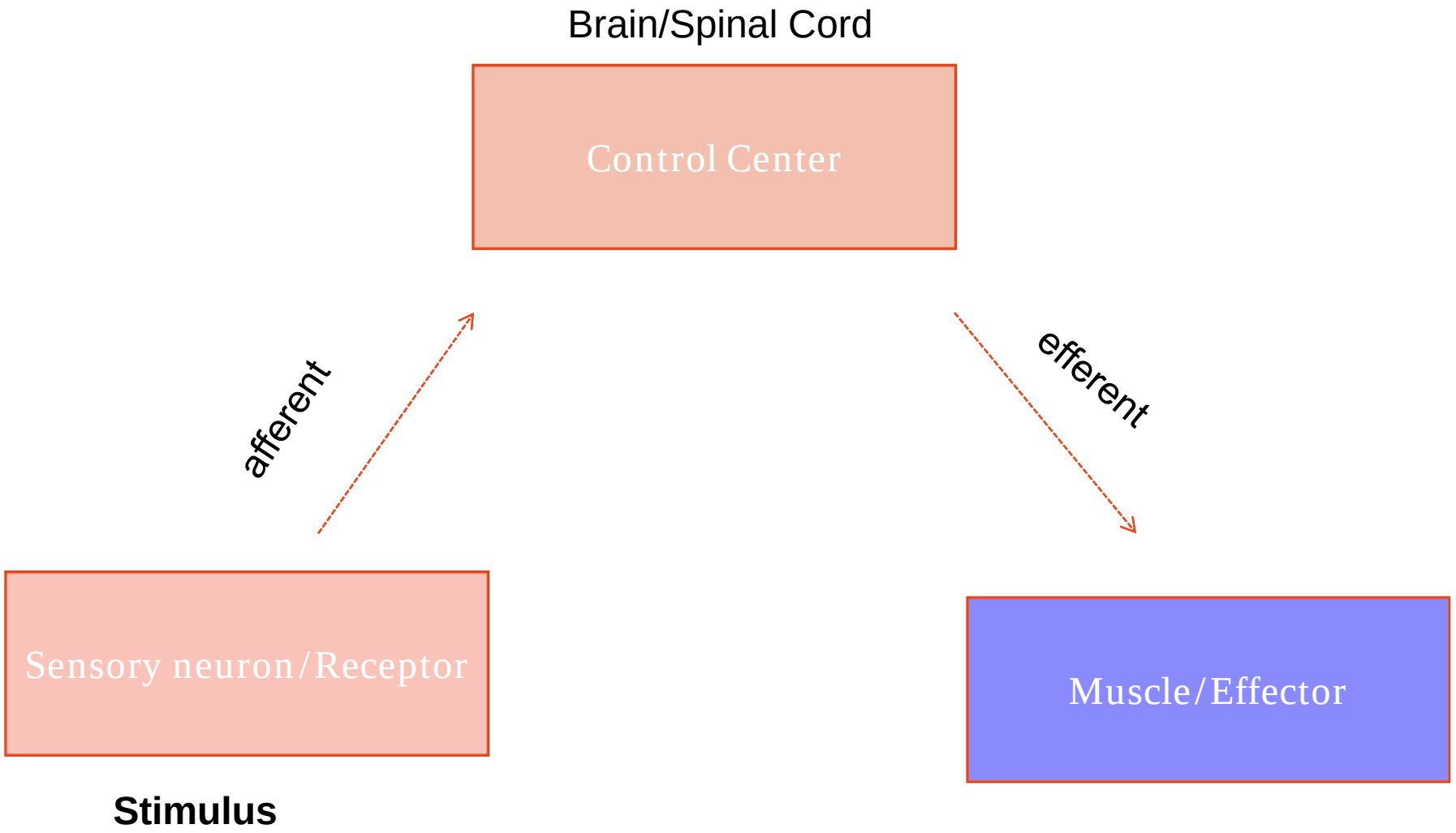
- Analyzes the information from the receptor and determines the appropriate response.



Effector

- 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.

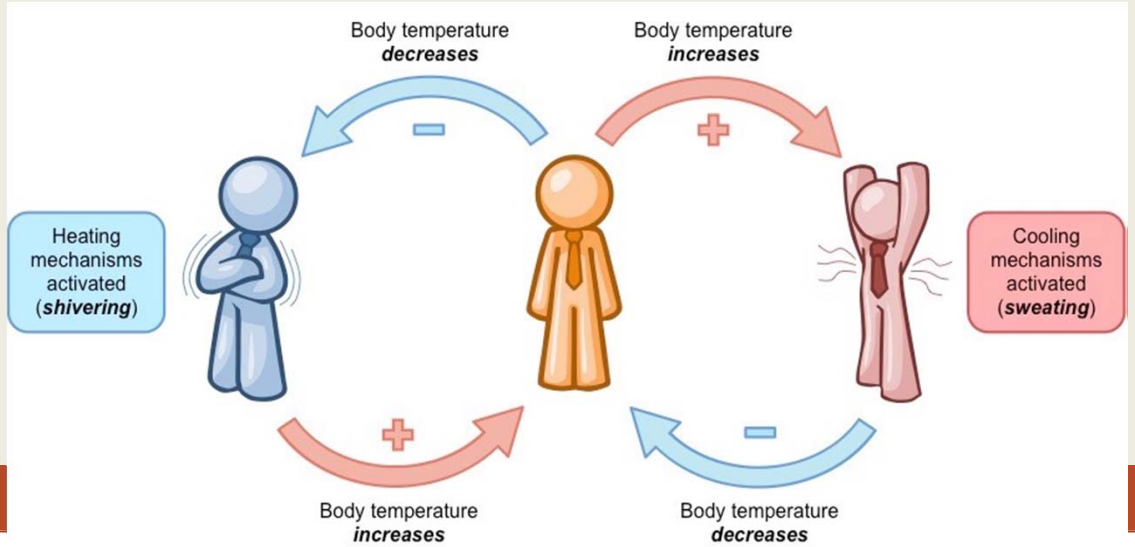




**This occurs between the muscular and nervous system

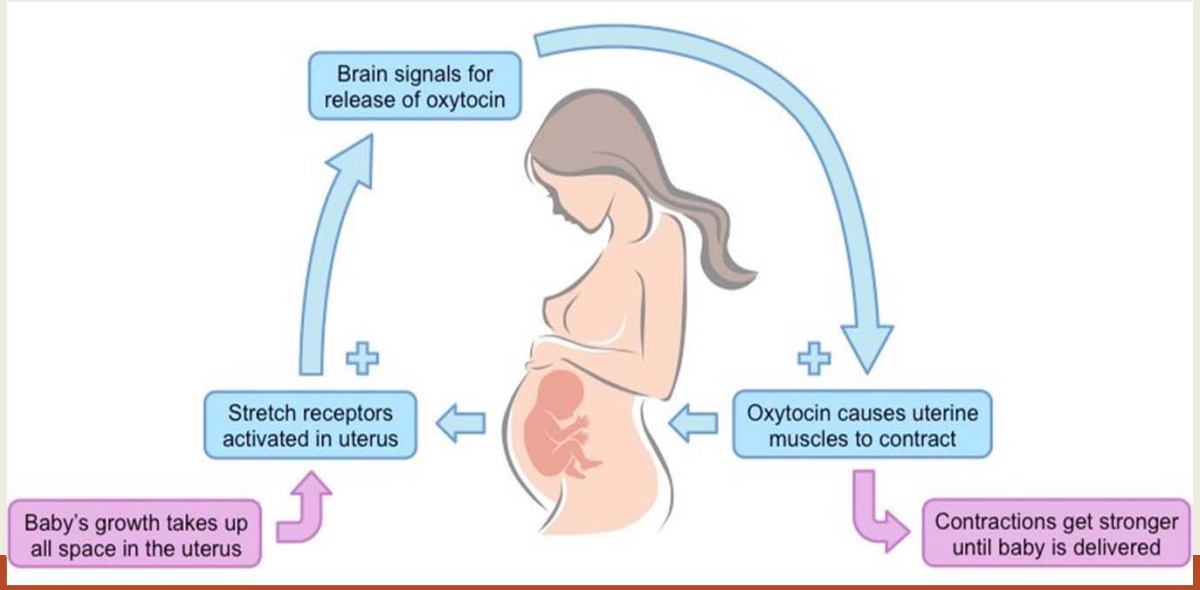
Negative Feedback Mechanism

- 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.



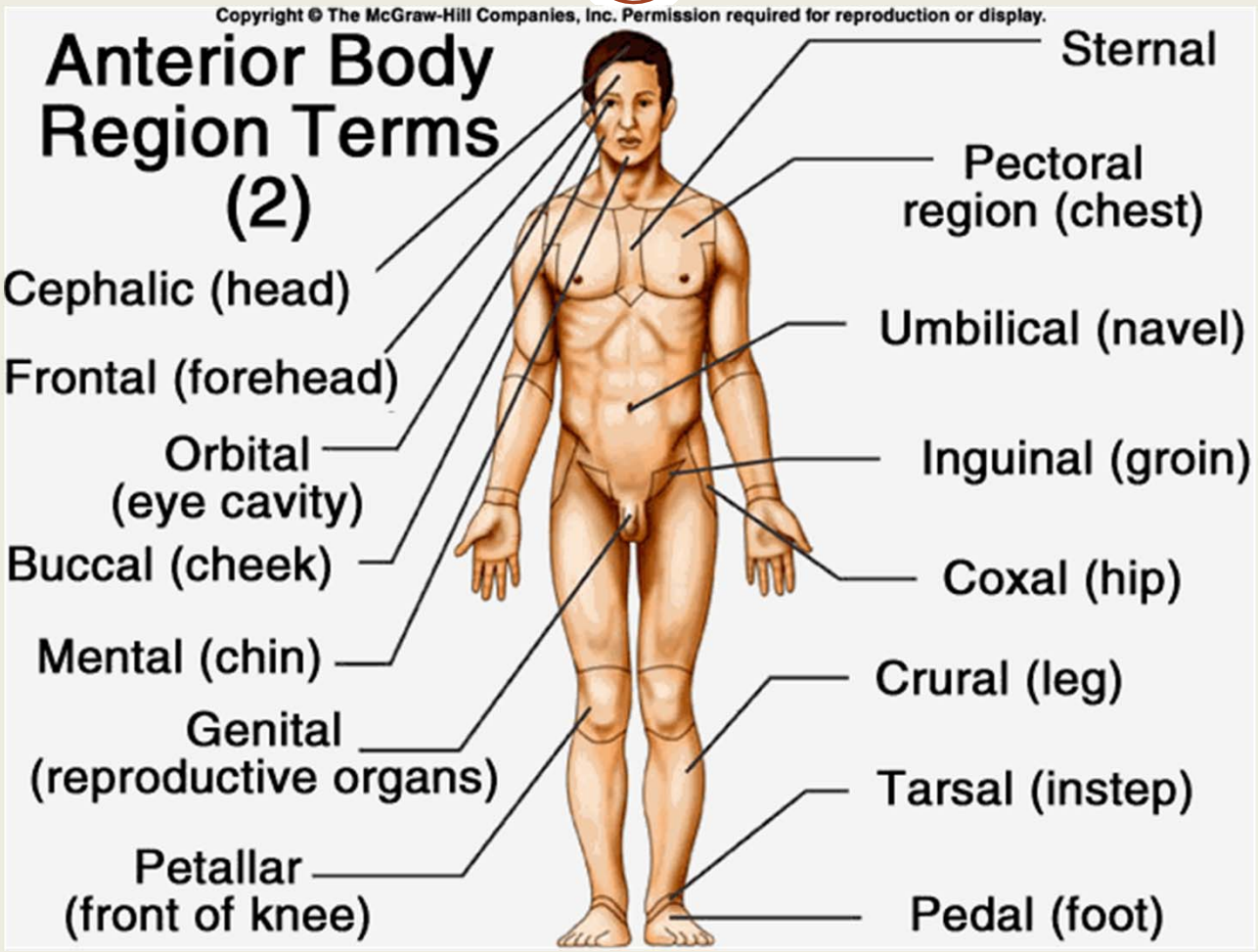
Positive Feedback Mechanisms

- Increases or enhances the original stimulus.
- Examples are blood clotting or the birth of a baby.
- Less common than negative feedback

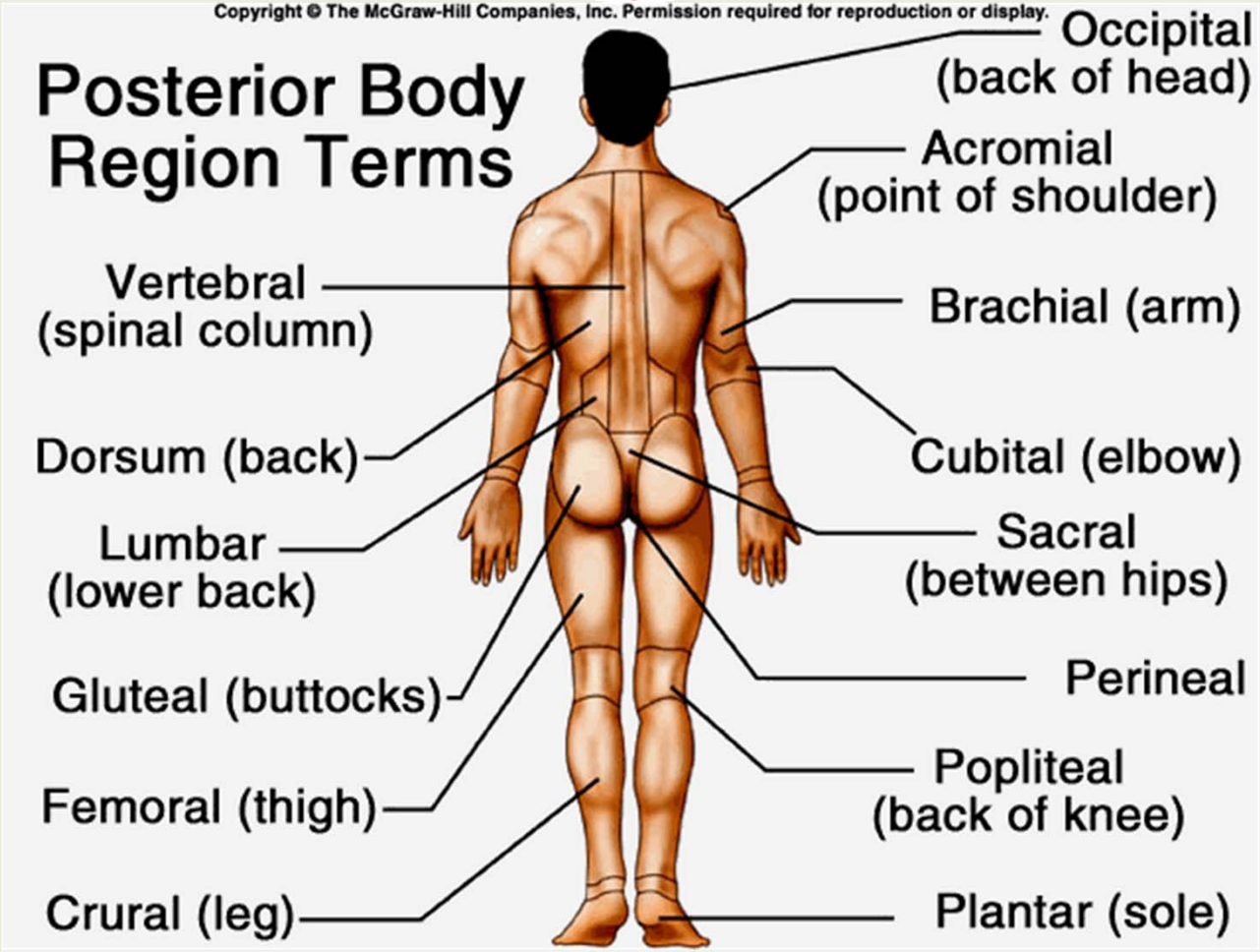


Language of Anatomy

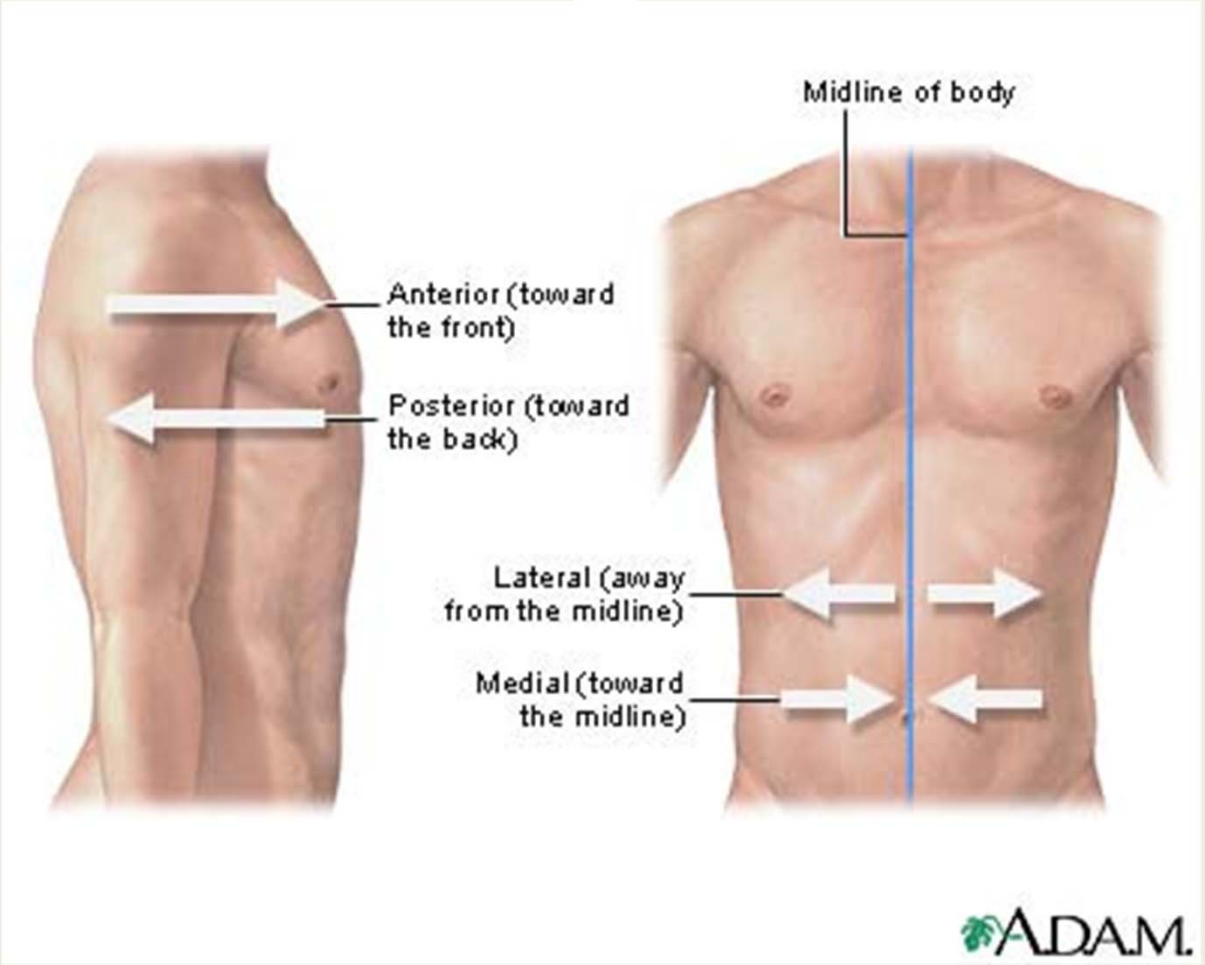
Anterior (Front)



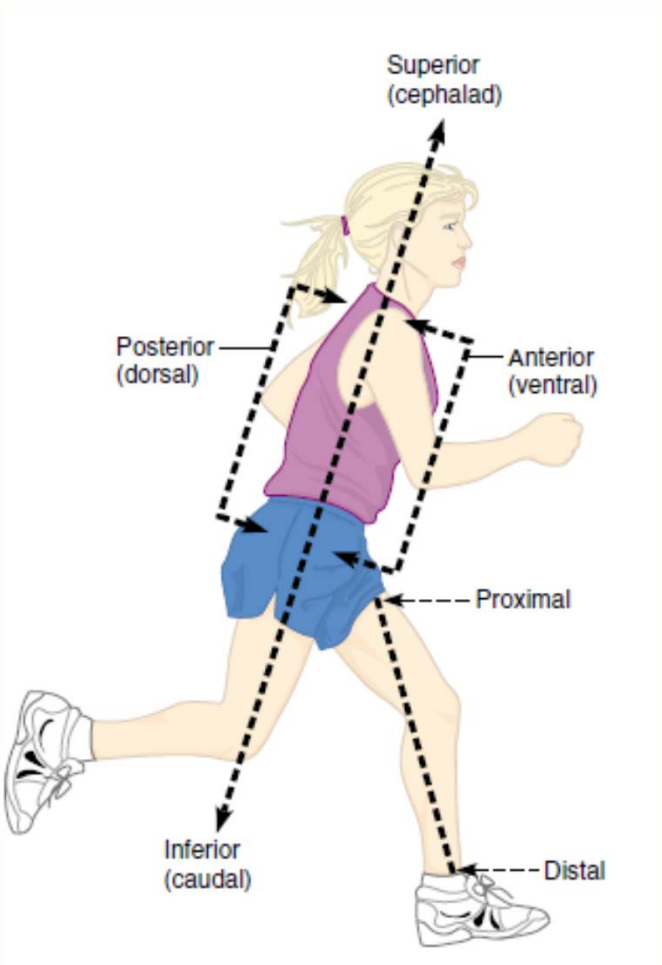
Posterior (Back)

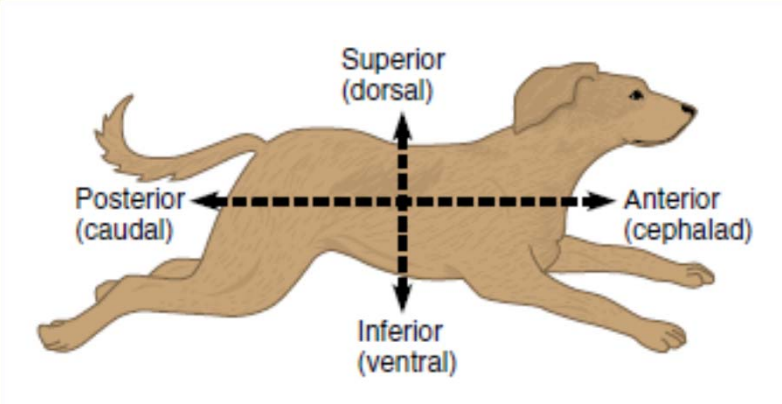


Medial and Lateral



2 Legs vs. 4 Legs





Planes of the Body

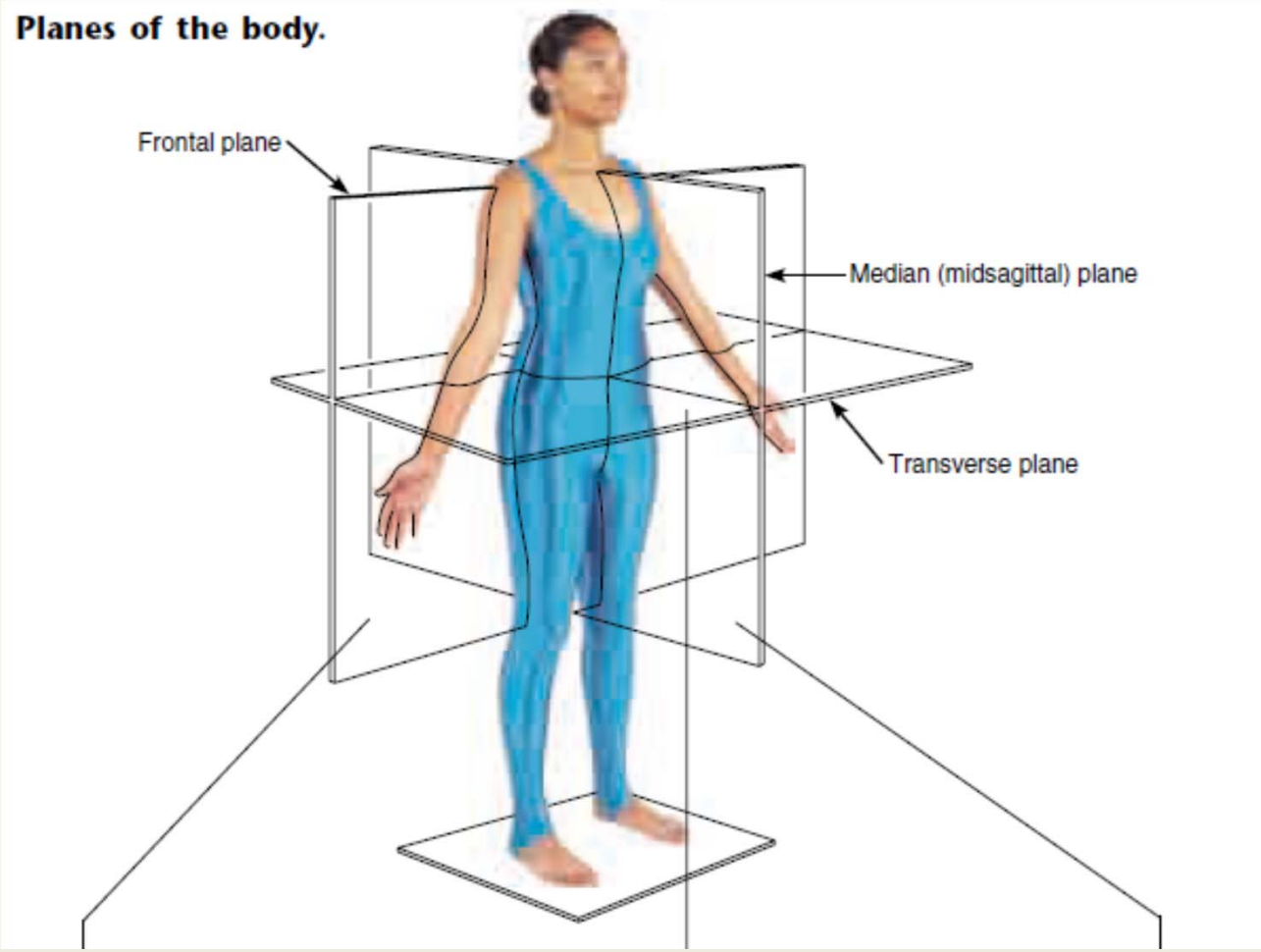
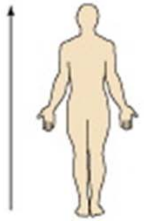
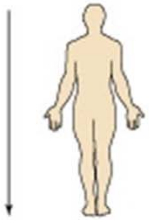


TABLE 1.1 Orientation and Directional Terms

Term	Definition	Illustration	Example
Superior (cranial or cephalad)	Toward the head end or upper part of a structure or the body; above		The forehead is superior to the nose.
Inferior (caudal)†	Away from the head end or toward the lower part of a structure or the body; below		The navel is inferior to the breastbone.
Anterior (ventral)*	Toward or at the front of the body; in front of		The breastbone is anterior to the spine.
Posterior (dorsal)*	Toward or at the backside of the body; behind		The heart is posterior to the breastbone.

†The term *caudal*, literally "toward the tail," is synonymous with *inferior* only to the inferior end of the spine.

**Ventral* and *anterior* are synonymous in humans; this is not the case in four-legged animals. *Ventral* refers to the "belly" of an animal and thus is the inferior surface of four-legged animals. Likewise, although the dorsal and posterior surfaces are the same in humans, the term *dorsal* refers to an animal's back. Thus, the dorsal surface of four-legged animals is their superior surface.

TABLE 1.1 Orientation and Directional Terms

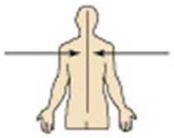
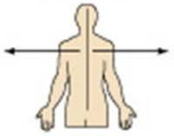
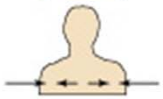
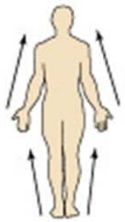
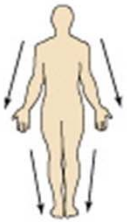
Term	Definition	Illustration	Example
Medial	Toward or at the midline of the body; on the inner side of		The heart is medial to the arm.
Lateral	Away from the midline of the body; on the outer side of		The arms are lateral to the chest.
Intermediate	Between a more medial and a more lateral structure		The armpit is intermediate between the breastbone and shoulder.
Proximal	Close to the origin of the body part or the point of attachment of a limb to the body trunk		The elbow is proximal to the wrist (meaning that the elbow is closer to the shoulder or attachment point of the arm than the wrist is).

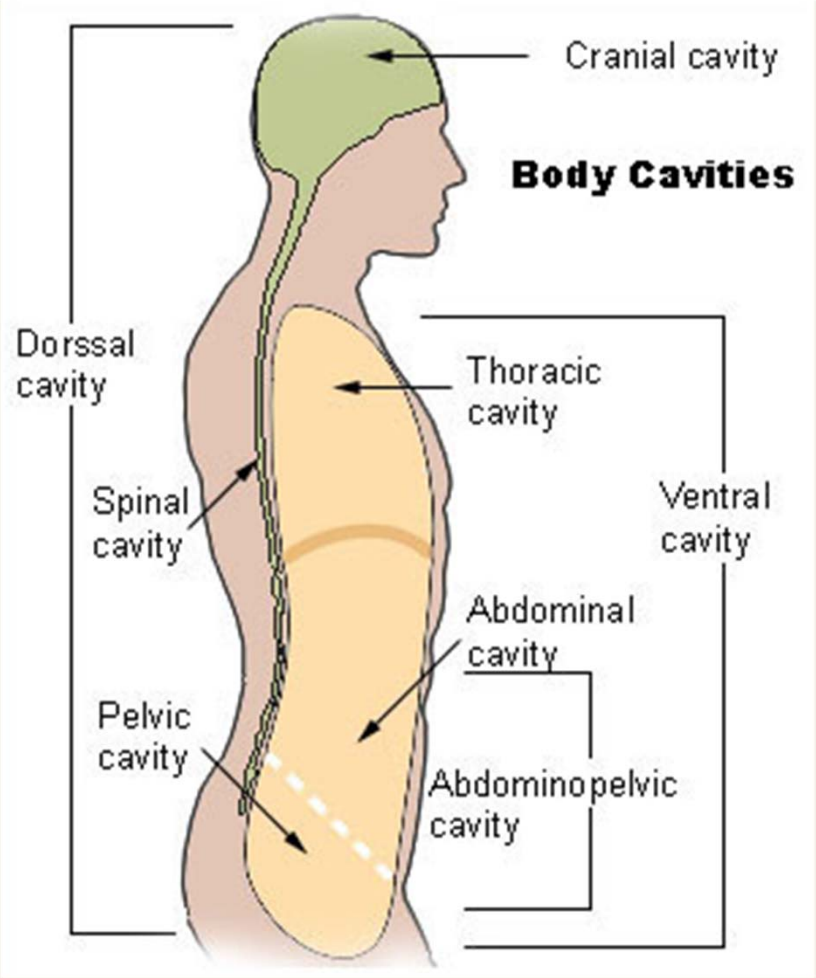
TABLE 1.1 Orientation and Directional Terms

Term	Definition	Illustration	Example
Distal	Farther from the origin of a body part or the point of attachment of a limb to the body trunk		The knee is distal to the thigh.
Superficial (external)	Toward or at the body surface		The skin is superficial to the skeleton.
Deep (internal)	Away from the body surface; more internal		The lungs are deep to the rib cage.

Body Cavities

Dorsal Body Cavities

- 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

- Thoracic cavity contains the heart and lungs protected by the ribs.
- Abdominal cavity (abdominopelvic) contains the stomach, liver and intestines.
- The thoracic and abdominal cavities are separated by a muscle called the diaphragm.