Body Systems

They all work together

Hierarchy of Body Organization

→ = Works together to make

Cells → Tissue → Organs → Organ Systems

What are groups of cells that work together to do the same type of work called?

- Tissues

What are groups of organs that do the same type of work called?

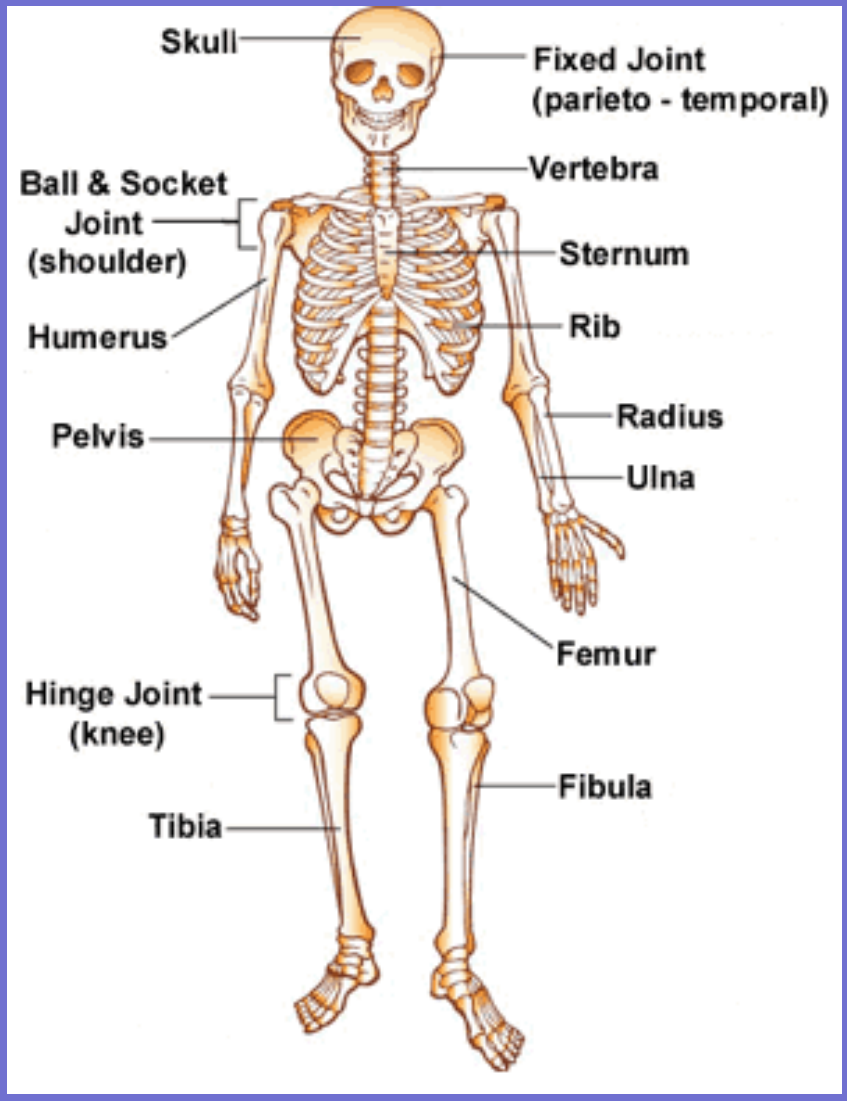
- Organ Systems

What are groups of organ systems that work together called?

- Organism

What system is this?

Skeletal System

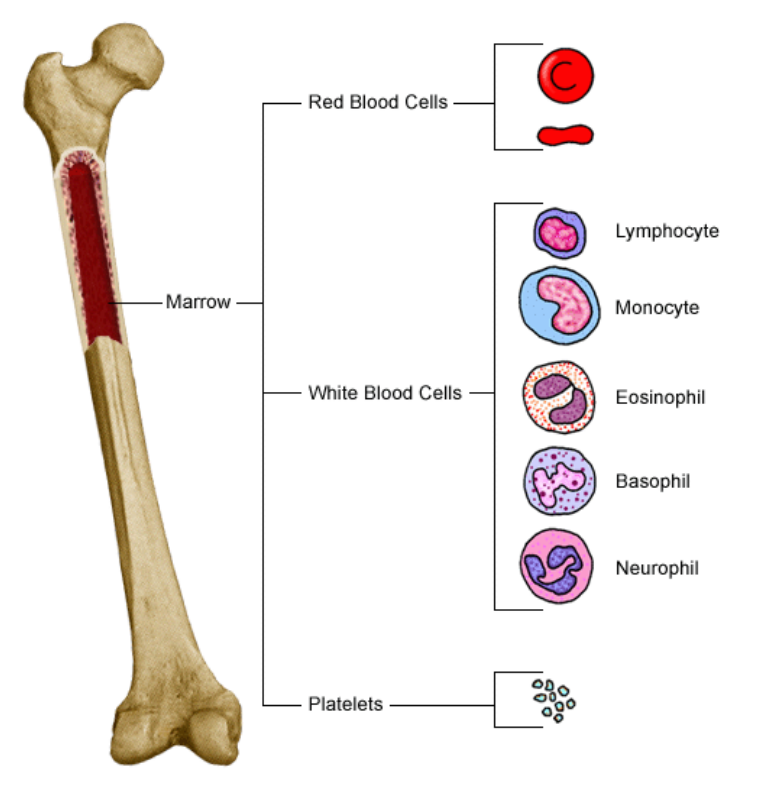


Skeletal System

Functions (what it does):

- Supports body.
- Protects organs.
- Works with muscles to move the body.
- Stores Calcium and Phosphorus for later use.
- Makes blood cells.

Bone Marrow



The bones produce blood cells

Cartilage is…

Cartilage – Smooth, slippery tissue that keeps bones from rubbing together. Found on the end of the bones, nose, and your ear.

Joints are…

Joints – Where two bones meet.
Movement occurs here.

Skeletal System Parts

Bones – They are alive! They are made of cells! Blood vessels feed them.

- Outside is "compact"
- inside is "spongy."

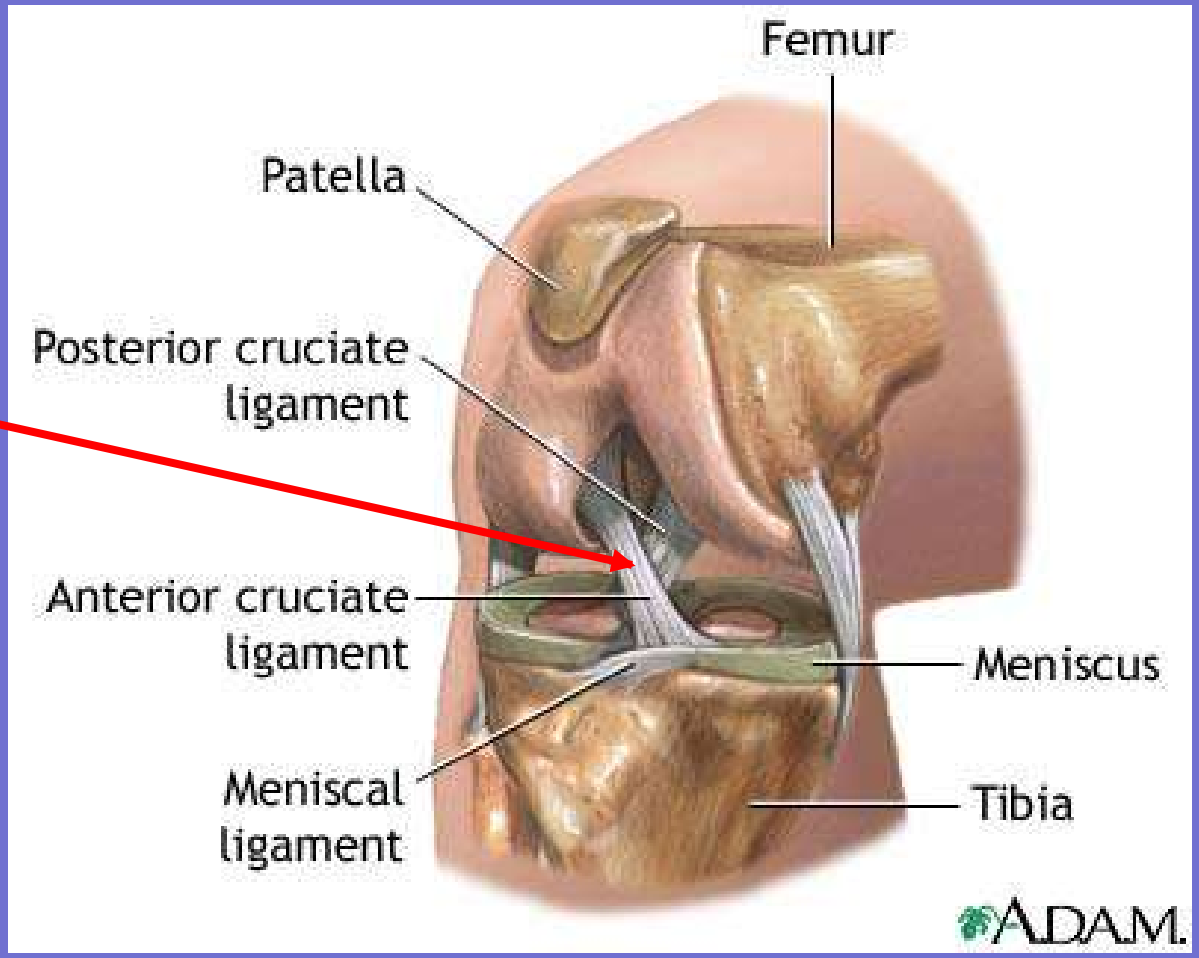
Ligaments are…

- **Ligaments** – Tough bands (like rubber bands) that hold bones together.

Ligaments – hold bones together

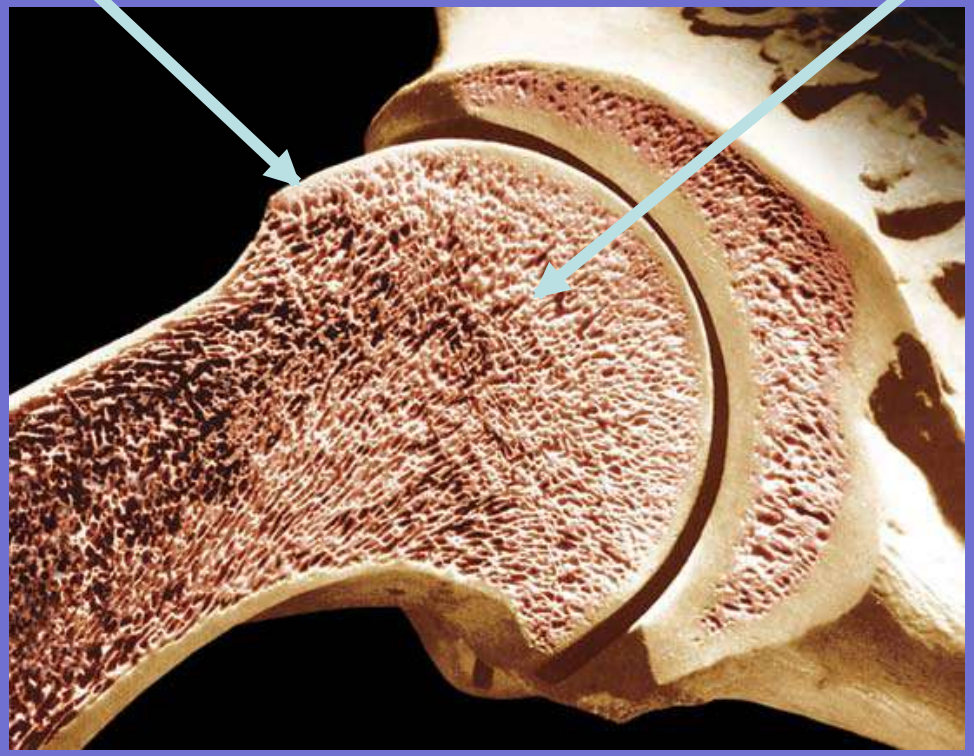
Knee Joint

The most common injury in sports. Note the ACL. It is often torn in football.



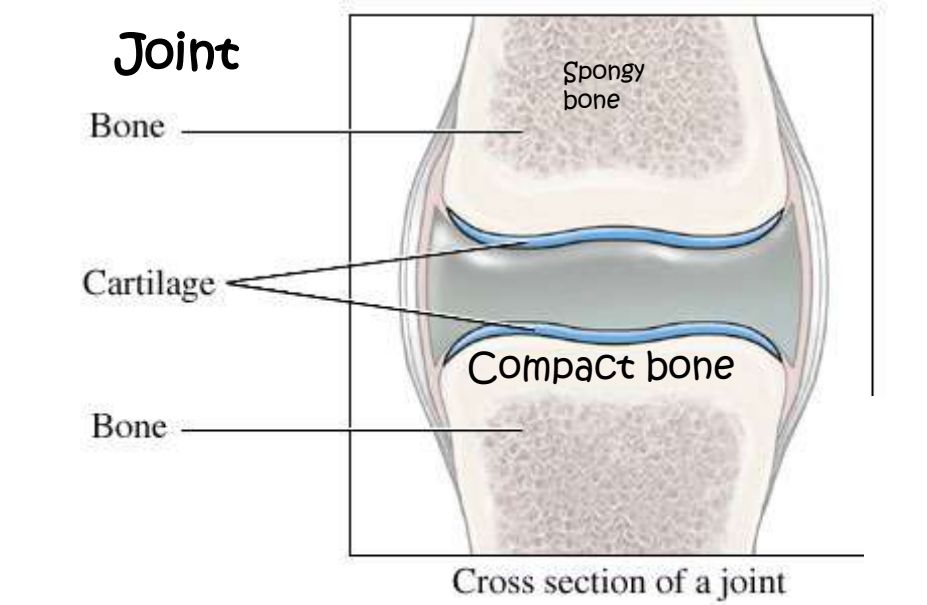
A picture of compact and spongy bone

Compact – hard bone on the outside.

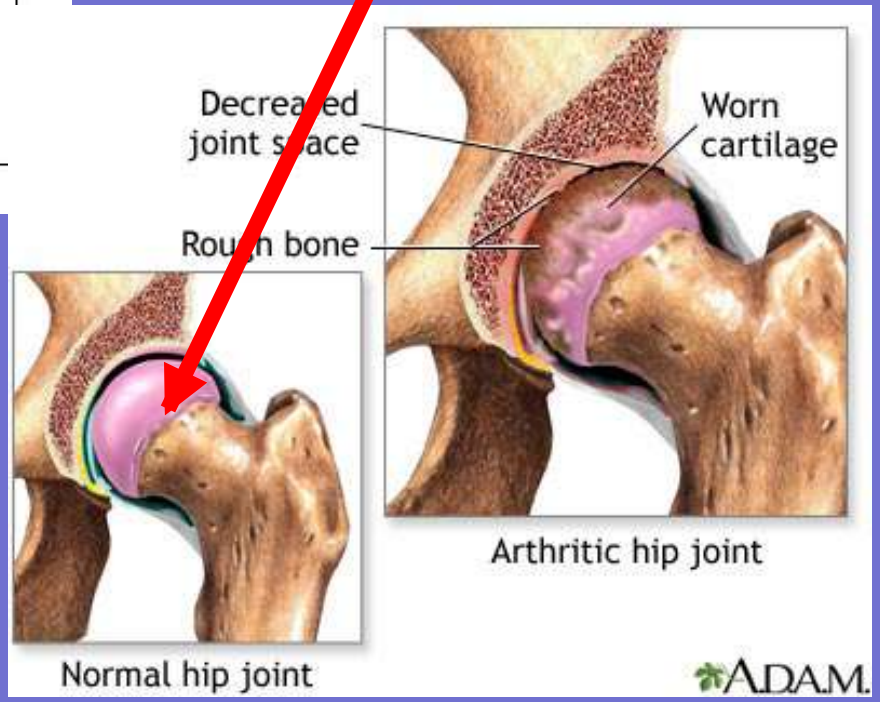


Spongy bone –near the end of bones where they are large. Keeps them light weight but strong.

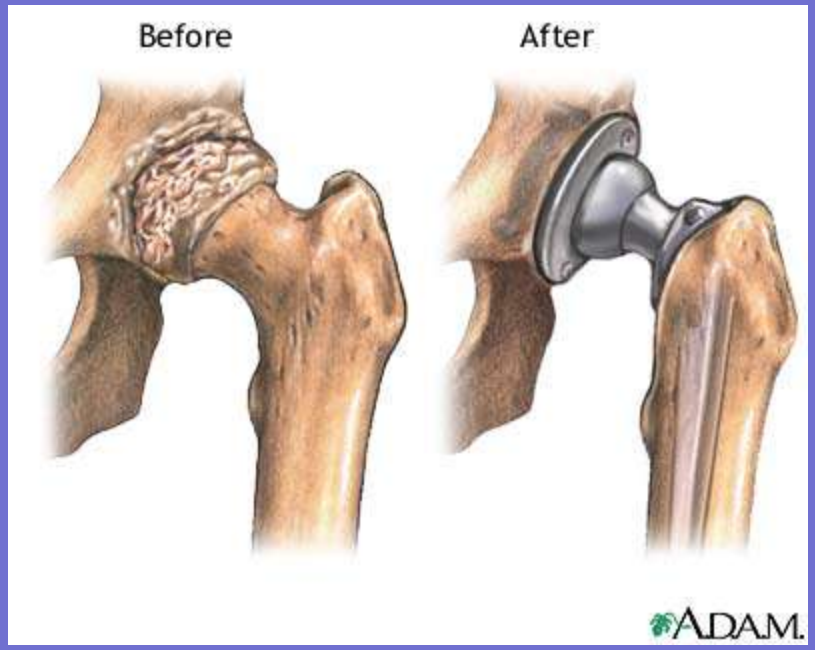
One more picture: Cartilage



When cartilage wears out bone rubs against bone and the joint becomes painful. Doctors now replace worn and damaged joints.

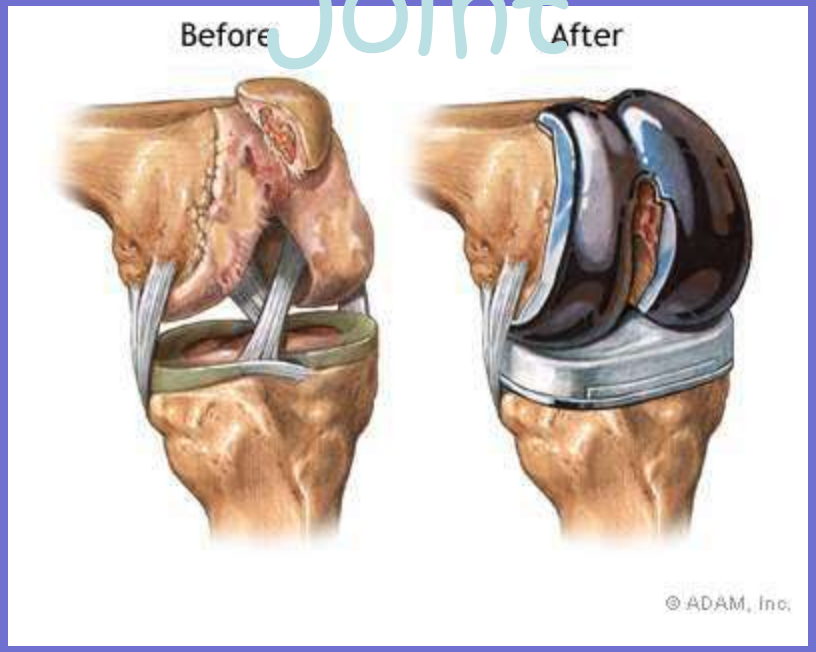


Joint replacement

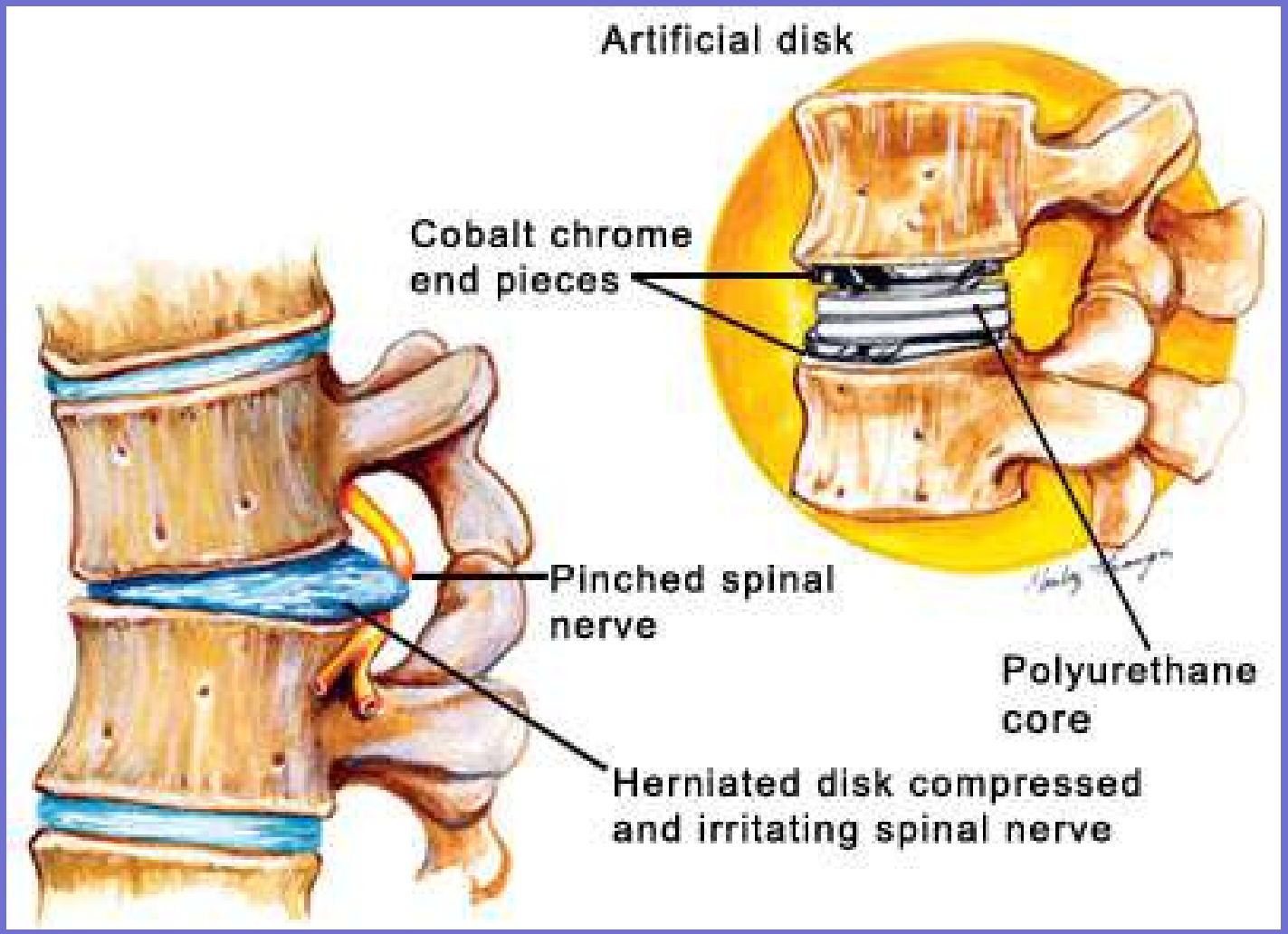


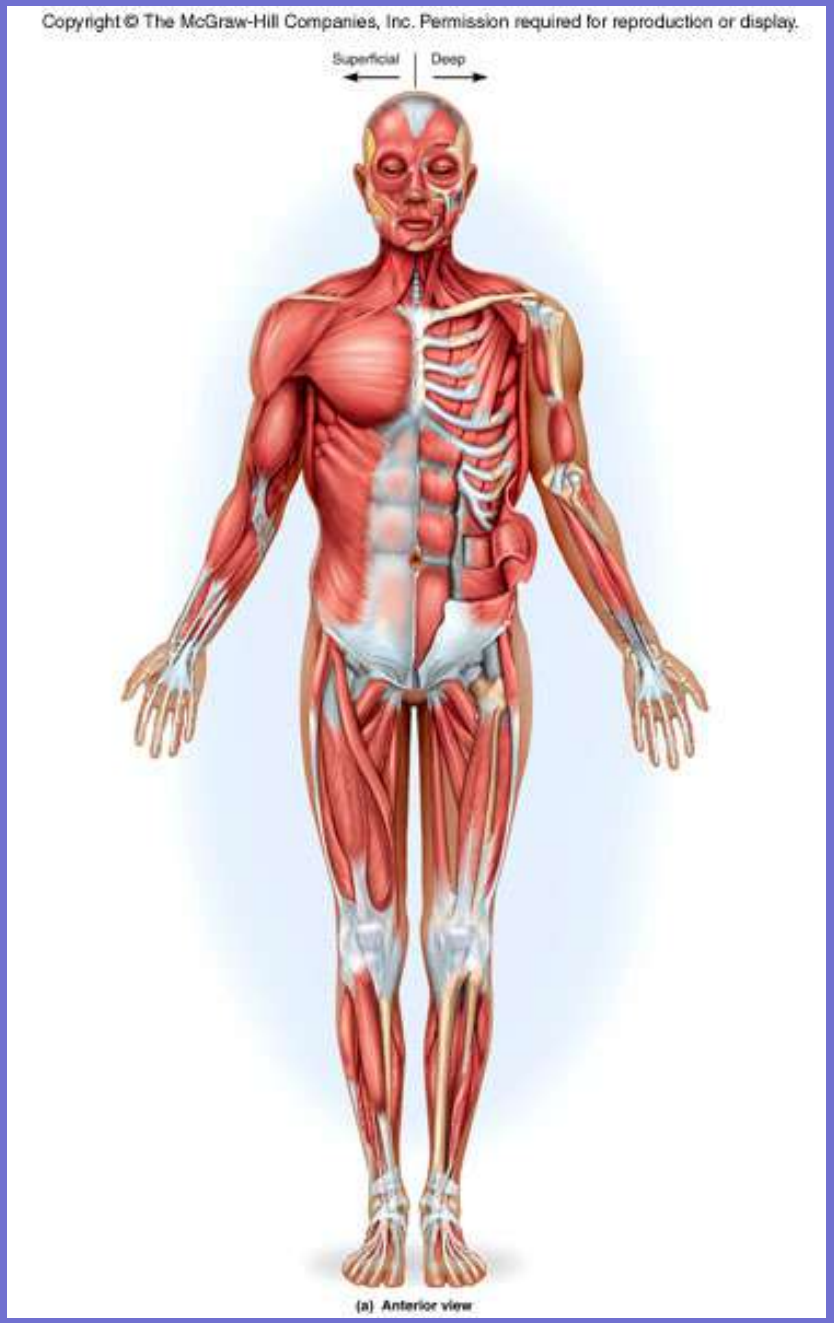
Hip Joint

Knee Joint



Cartilage is found between the disks in your spine.





What system is this?

Muscular System

Function:

Involved in all movements of the body.

What systems of the body work together so that the body can move?

- Your skeletal system and muscular system work together to actually move.
- The signals about when and how to move come from the Nervous System (brain).

What is a muscle?

Muscle – fibrous organ that contracts and relaxes.

Voluntary - muscles that you are able to contract

Involuntary - muscles that YOU can't control

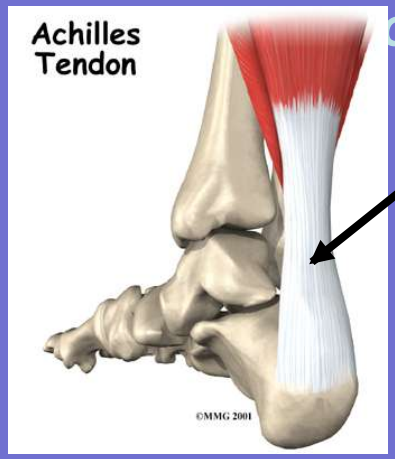
Types of Muscles

1. Skeletal Muscle – works with bones to move you around.
2. Cardiac Muscle – found in your heart. Pumps the blood.
3. Smooth Muscle – Diaphragm helps you breathe. Arteries are muscular. Intestines have muscles to move your food along.

Skeletal Muscle Parts

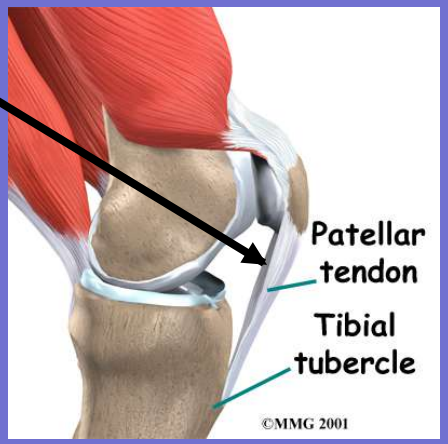
Muscle – fibrous organ that contracts and relaxes.

Tendons – tough bands that attach muscle to bone. (If they weren't attached to bone, they wouldn't move.)

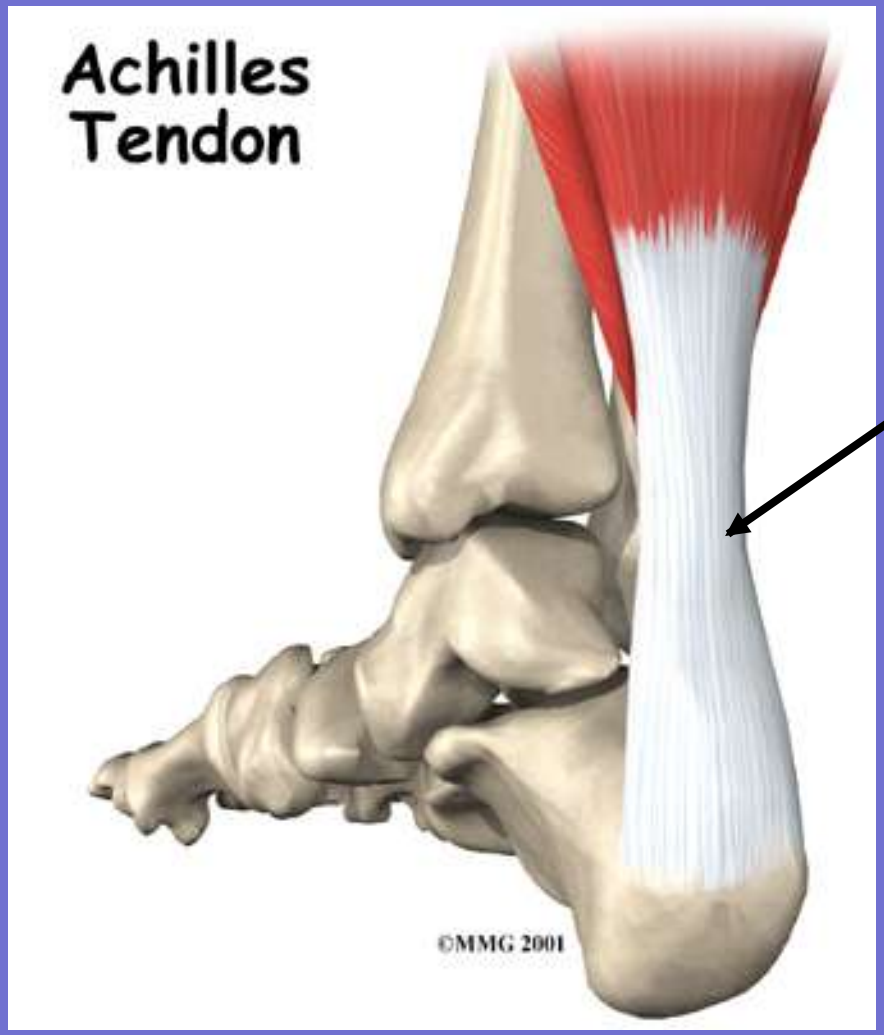


Hooks calf muscle to the heel bone.

Hooks thigh muscle to the lower leg bone.

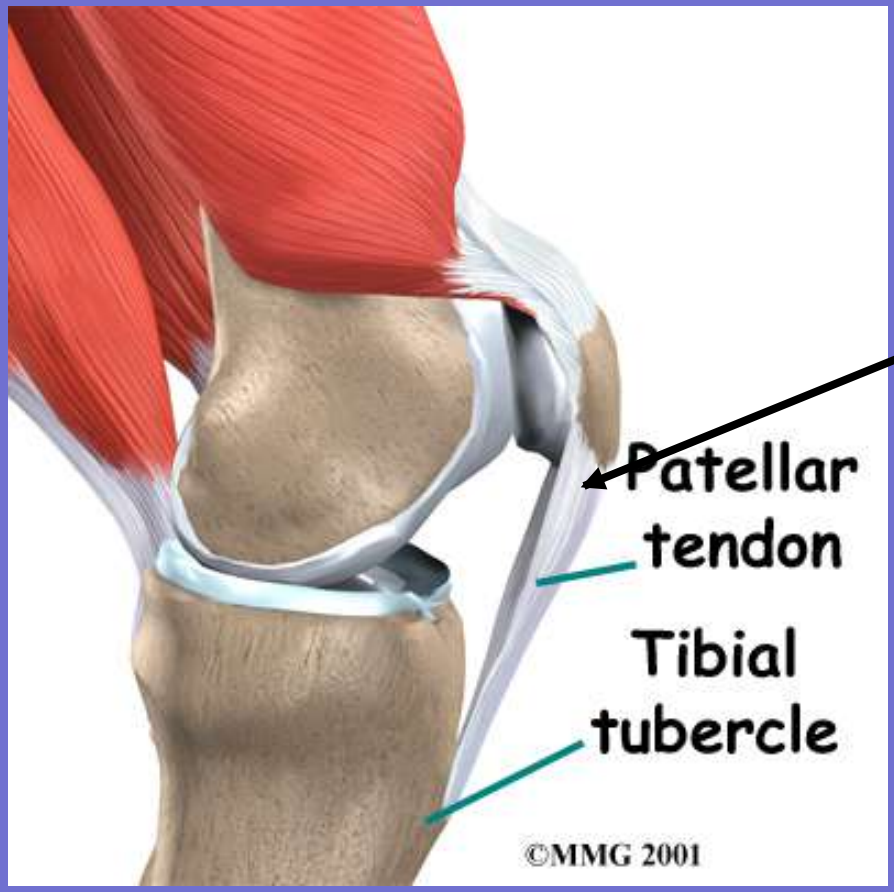


Tendons – tough bands that attach muscle to bone.



Hooks calf muscle to the heel bone.

Tendons – tough bands that attach muscle to bone



Hooks thigh muscle to the lower leg bone.

What kind of muscle can you choose to move?

- Voluntary

What kind of muscle moves naturally and without effort?

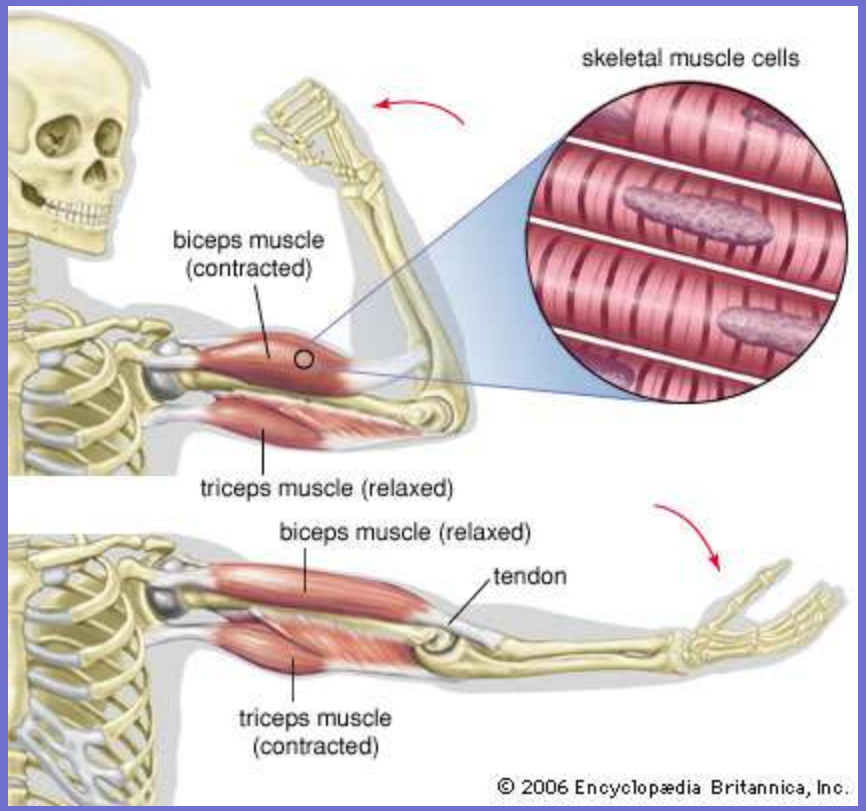
- Involuntary

- Tightening = Contracting

You can feel it get bigger. ("flexing")

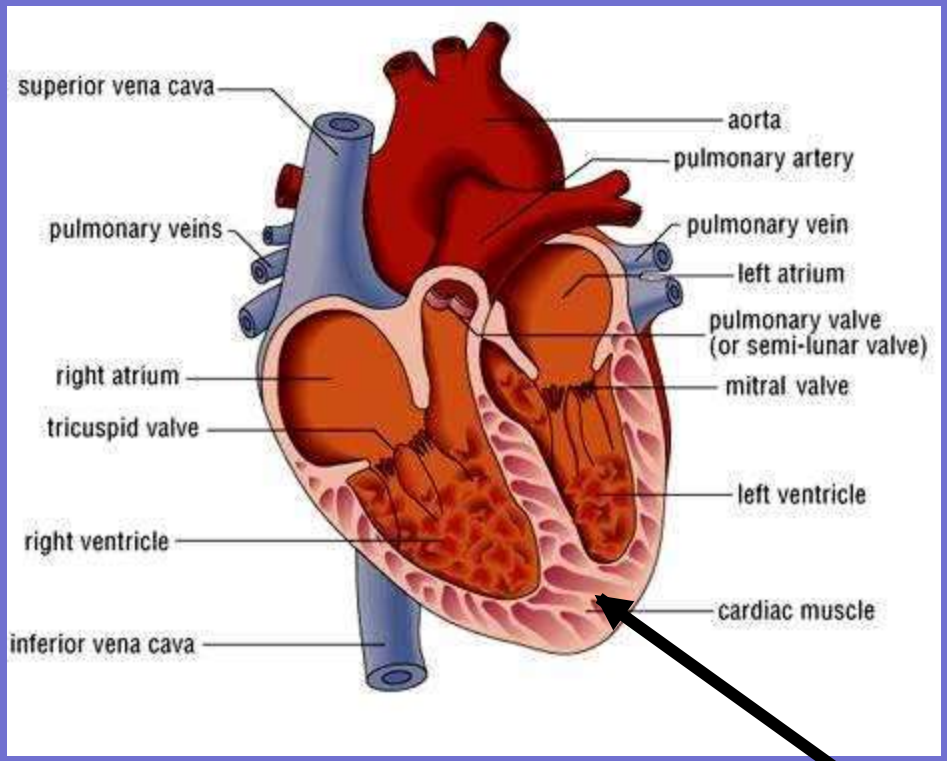
- Relaxing = the muscle doesn't get bigger

Don't forget muscles are organs and are made of cells!!! And tissues!!!!

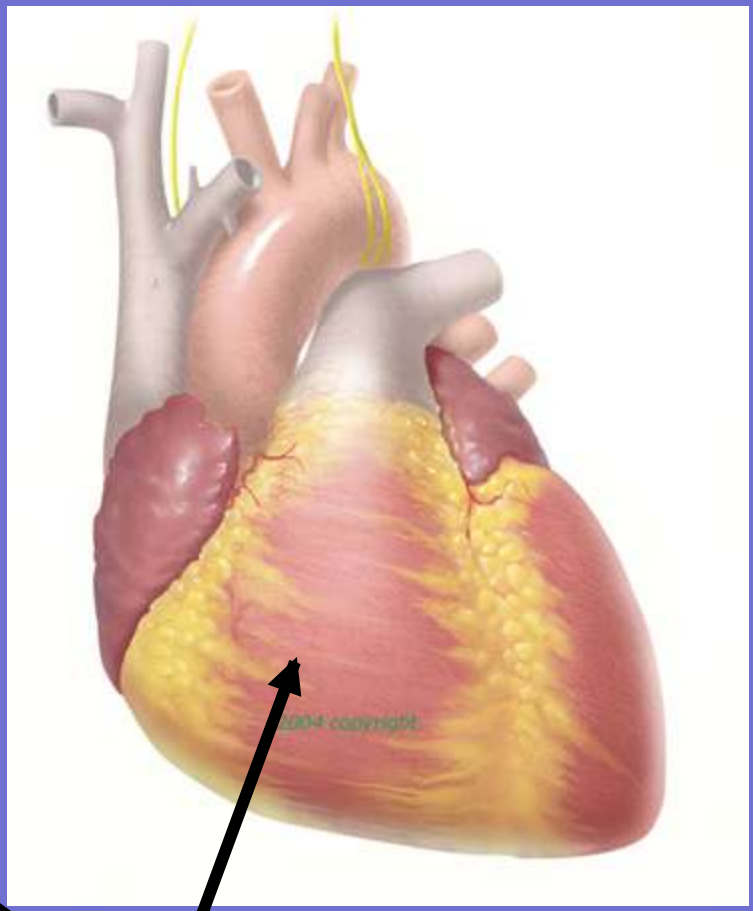


Cardiac Muscle

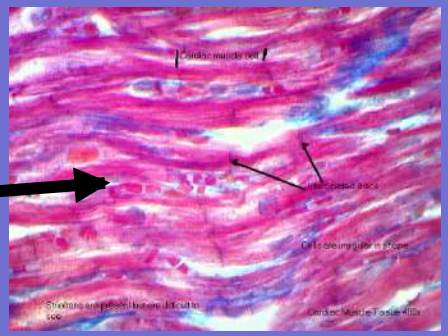
Heart cut open



Outside of heart

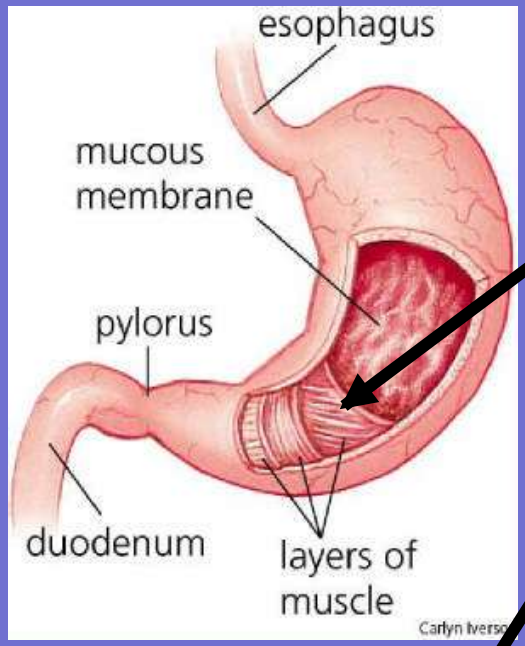


Cardiac muscle cells under the microscope.

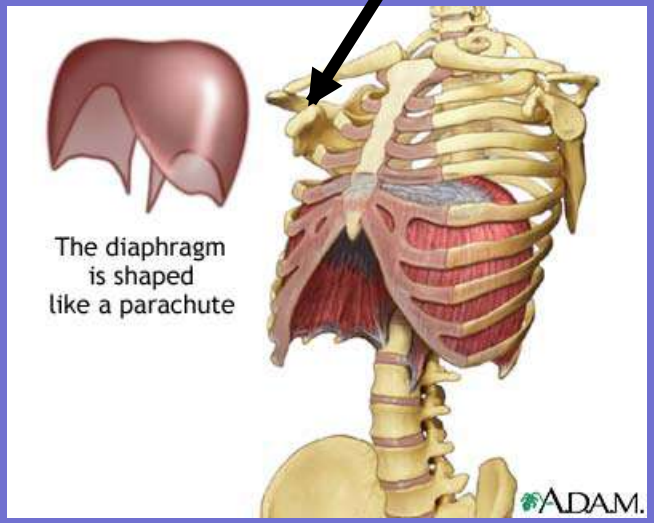


Heart muscle

Smooth Muscle



Smooth muscle is the one we often do not think about. It is part of our digestive system, respiratory system and circulatory systems.

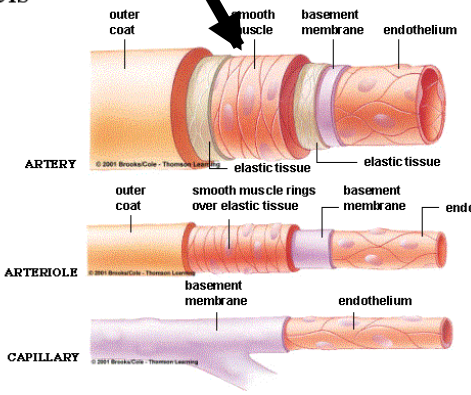


Blood Vessels

Arteries: main transporters of oxygenated blood

Arterioles: diameter is adjusted to regulate blood flow

Capillaries: diffusion occurs across thin walls



What are the 3 types of muscles?

- Skeletal
- Smooth
- Cardiac

What is the function of a tendon?

- Tendons attach muscle to bone.

What is the function of a ligament?

- They hold bones together.
- Attach bone to bone.

What is a fibrous organ that contracts and relaxes.?

- Muscle

The heart is a _____ and a _____.

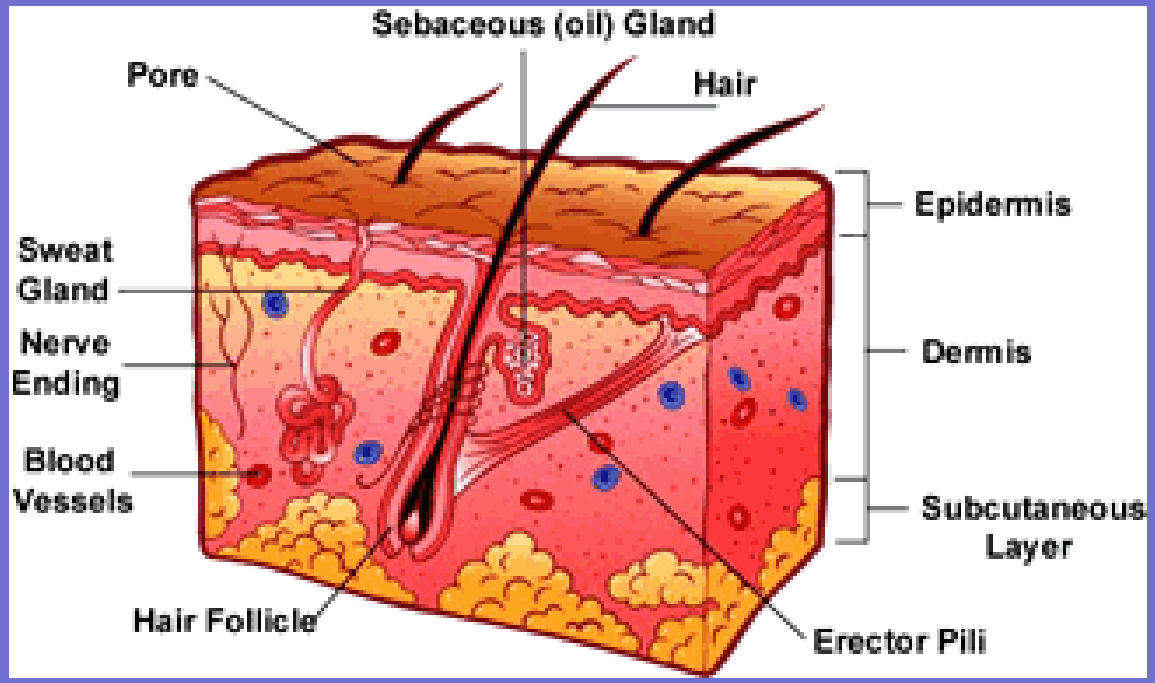
- Muscle and organ

Skin

Purposes

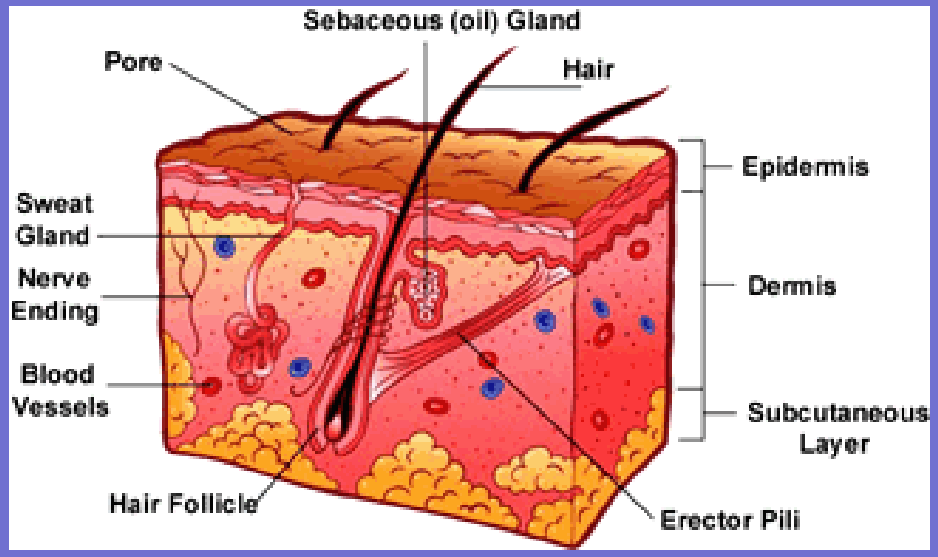
1. Keeps bacteria and disease causing organisms out of the body.
2. Senses your environment.
3. Regulates body temperature.
4. Rids body of wastes.
5. Prevents injury to deeper tissues.

Skin parts



- Epidermis – outer layer (dead cells)
- Dermis – live cells underneath
- Fat – underneath dermis

- Oil glands
- Sweat glands
- Hair follicle



The skin is also known as the Integumentary System.

What are the layers of the skin from top to bottom?

- Epidermis – Outer skin
- Dermis
- Fat (Subcutaneous Layer)

In what layer are skin cells made?

- They are made in the Dermis layer.

When you rub off skin cells on your arm, which layer are you removing skin cells from?

- Epidermis

Digestive System

Purpose:

Breaks down food into small molecules the cell can use.

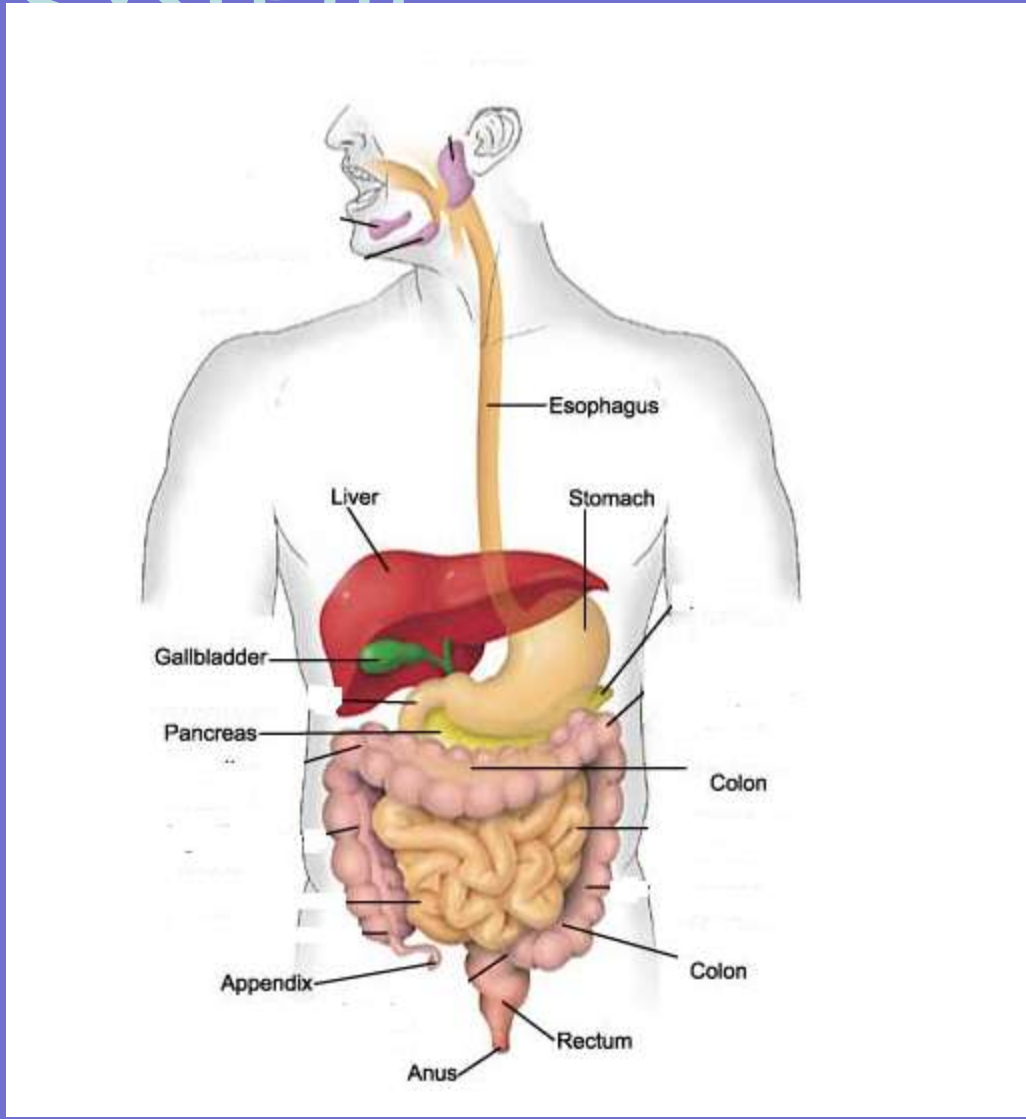
Organs of the Digestive System

Organs in the order food passes through them:

- **Mouth**
- **Esophagus**
- **Stomach**
- **Small Intestine**
- **Large Intestine**
- **Rectum**

Organs that make or store digestive enzymes:

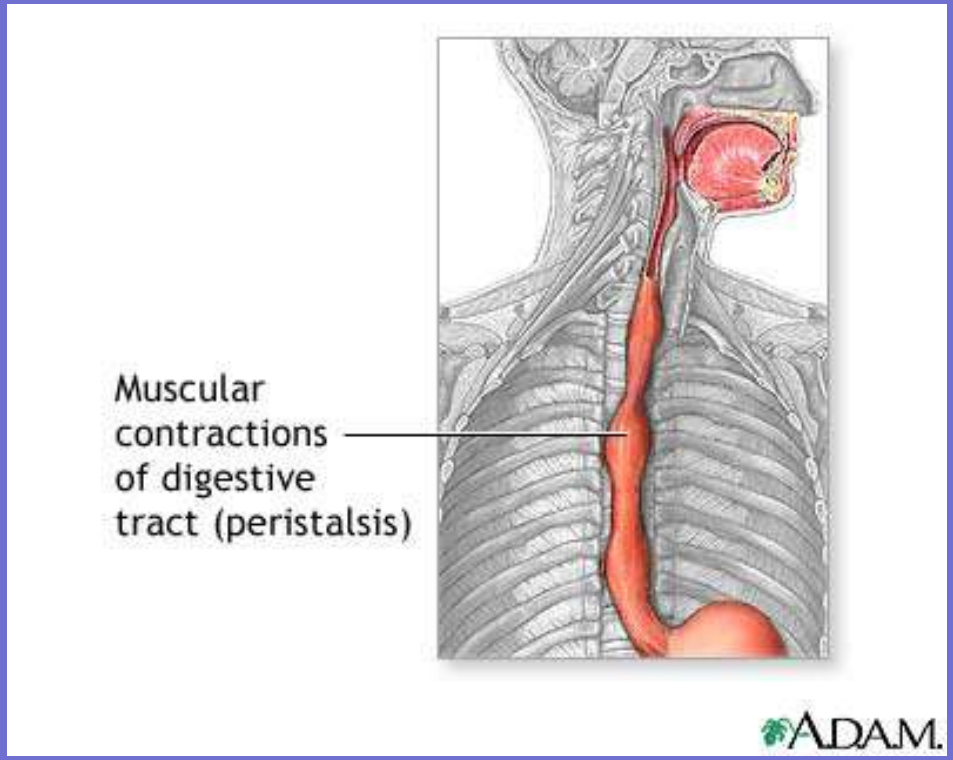
- **Liver**
- **Gall bladder**
- **Pancreas**



Parts of the digestive system and what they do

Mouth – mechanical (chewing) and chemical digestion - saliva released.

Esophagus – carries food to stomach. Peristalsis.



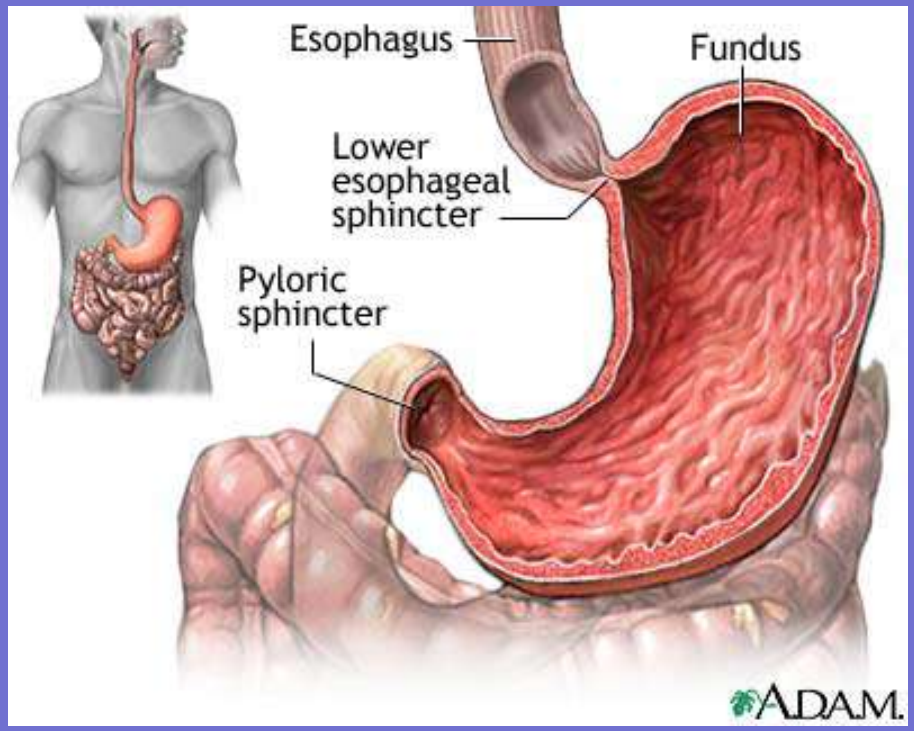
Peristalsis

- The contraction of the digestion tract to move food so it can be digested.

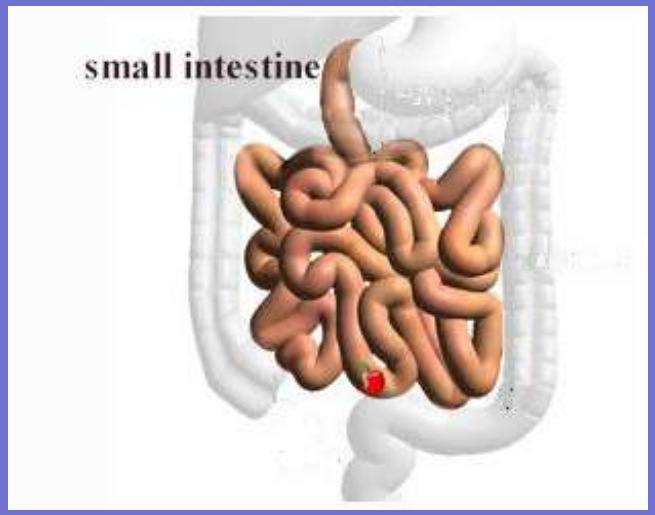
Stomach

- Mixes food with enzymes and stomach acid.

- Kills bacteria you have eaten

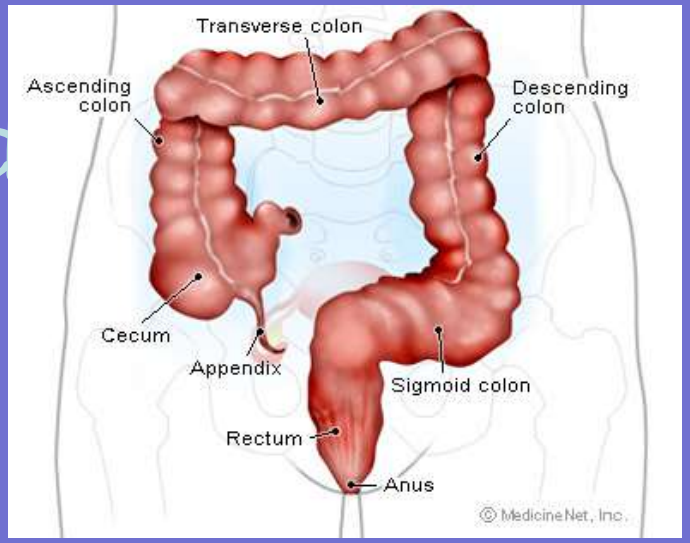


Parts of the digestive system and what they do



Small intestine – digestion continues and absorption occurs.

Large intestine – holds feces and absorbs water.



What are the major organs of the digestive system?

- Mouth
- Esophagus
- Stomach
- Small Intestine
- Large Intestine
- Rectum

What is Peristalsis?

- The contraction of the digestion tract to move food so it can be digested.

Which system carries, carries, carries???

- The circulatory
- Remember, the blood carries lots of stuff all over the body.

Circulatory System

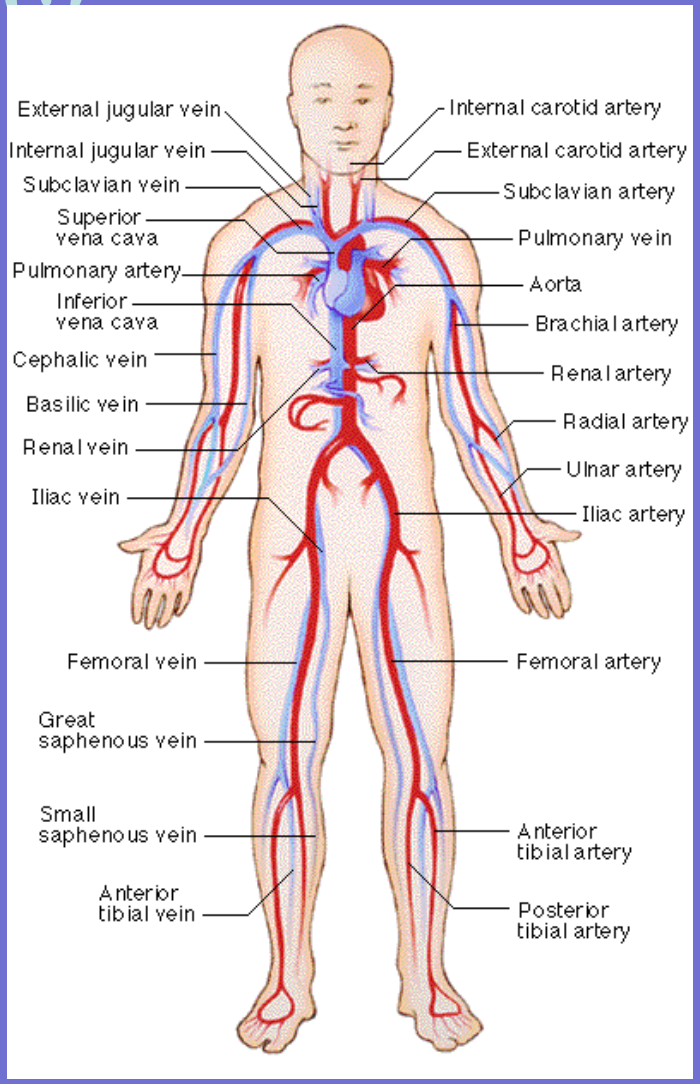
Body's Transportation System

Functions:

1. Carries oxygen from the lungs to the cells.
2. Carries carbon dioxide away from cells to the lungs.
3. Carries food from intestines to cells.
4. Carries hormones, minerals, vitamins, etc. (Carries, carries, carries, carries….)

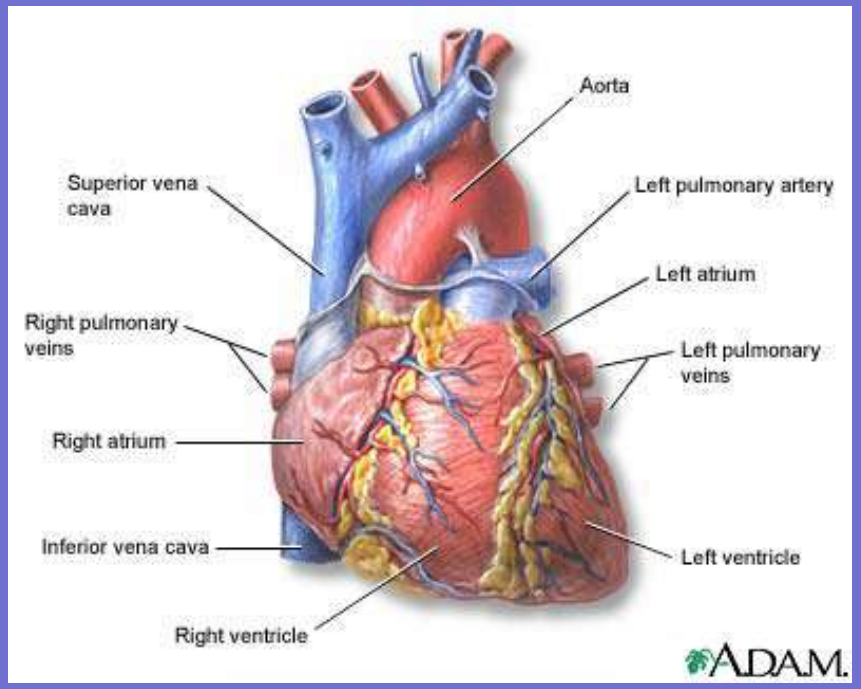
Parts of the Circulatory System

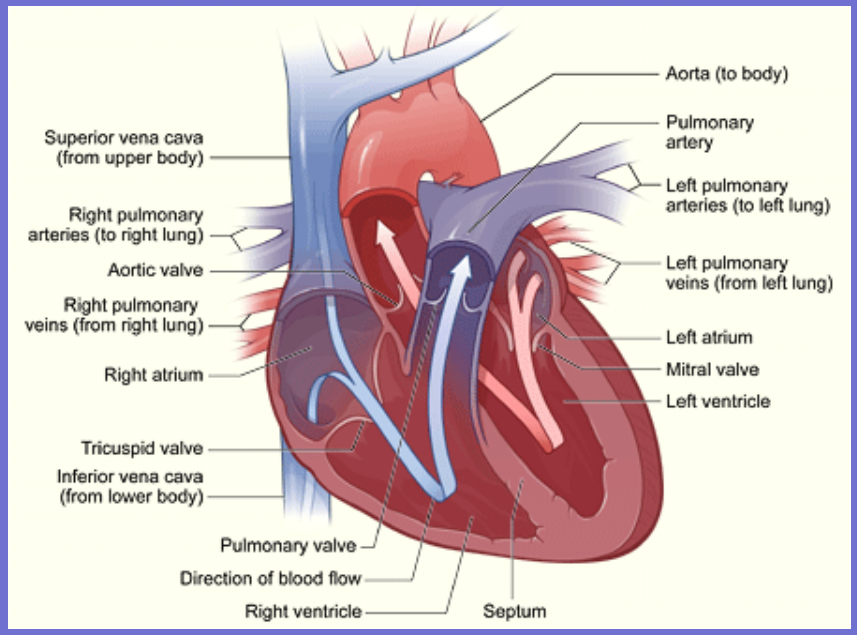
- Heart
- Blood Vessels
- Blood



Heart

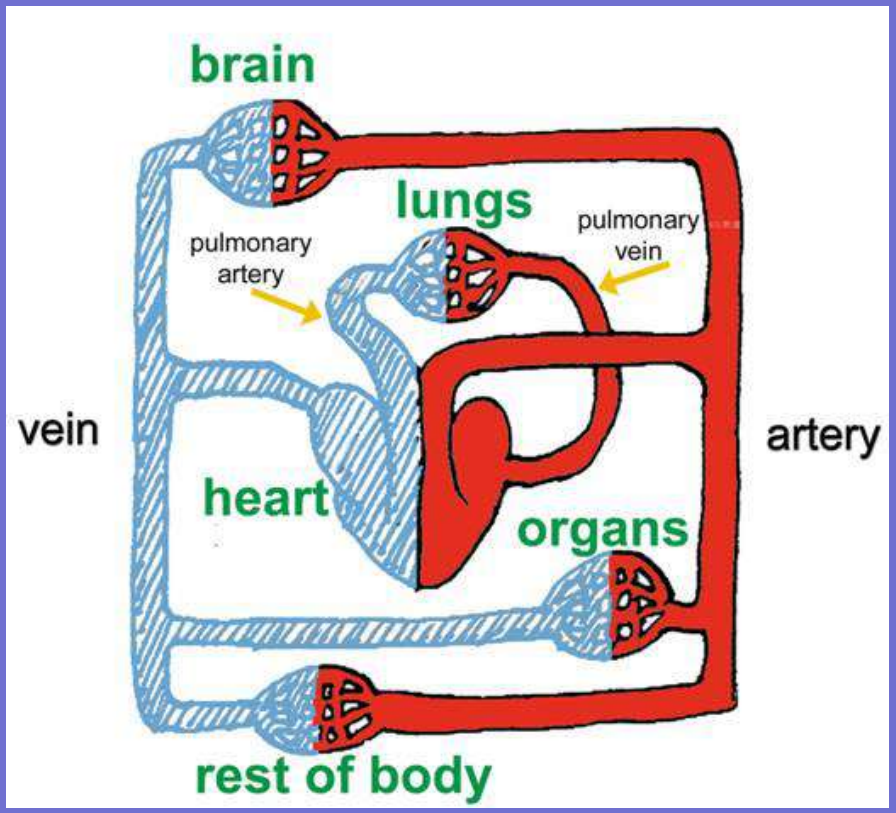
- Pumps blood
- Is mostly muscle
- Has 4 chambers inside.
- Has its own arteries and veins. When these get stopped up a heart attack occurs.





Vessels

- **Arteries** – thicker than veins. Carry blood away from the heart.
- **Veins** – thinner than arteries. Carry blood back to the heart.
- **Capillaries** – tiny little vessels that reach all of your cells.



What are the 3 types of vessels of the circulatory system?

- Veins
- Arteries
- Capillaries

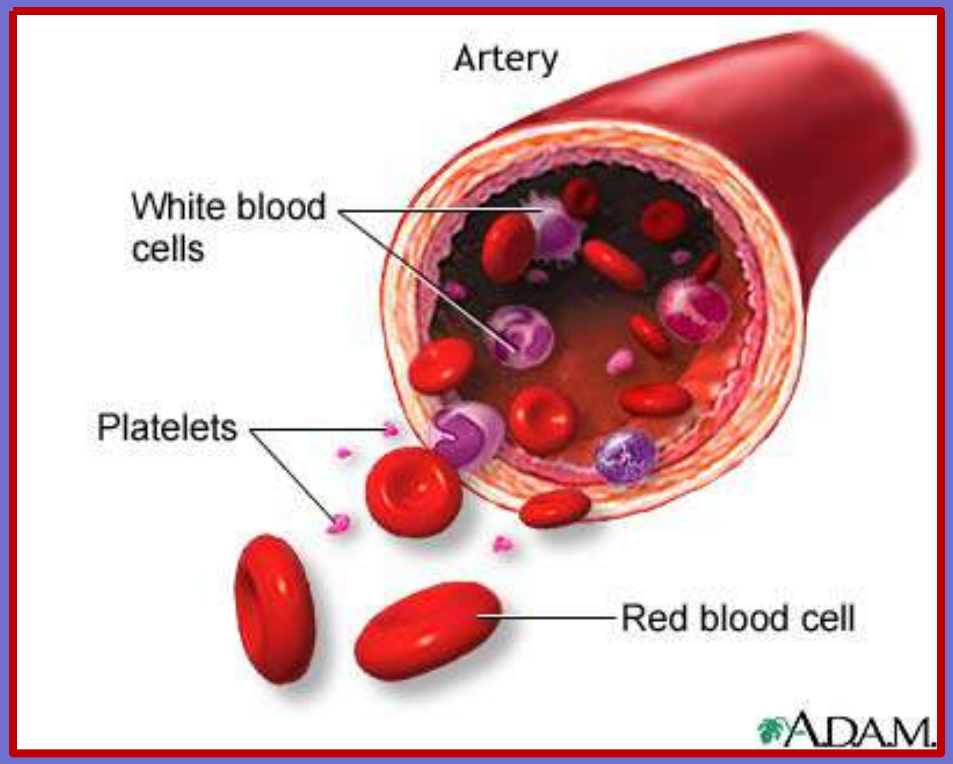
What do arteries do with blood?

- They carry blood away from the heart.

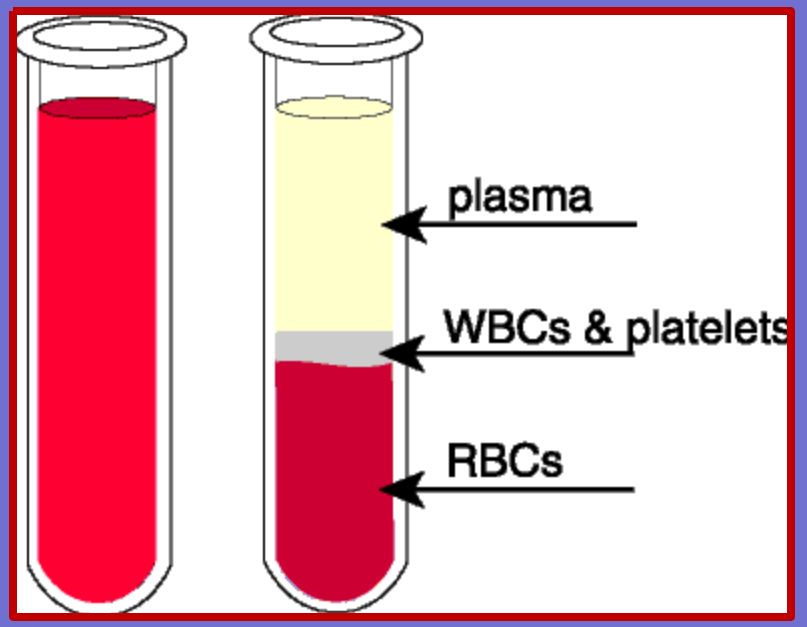
What do veins do with blood?

- They carry blood to the heart.

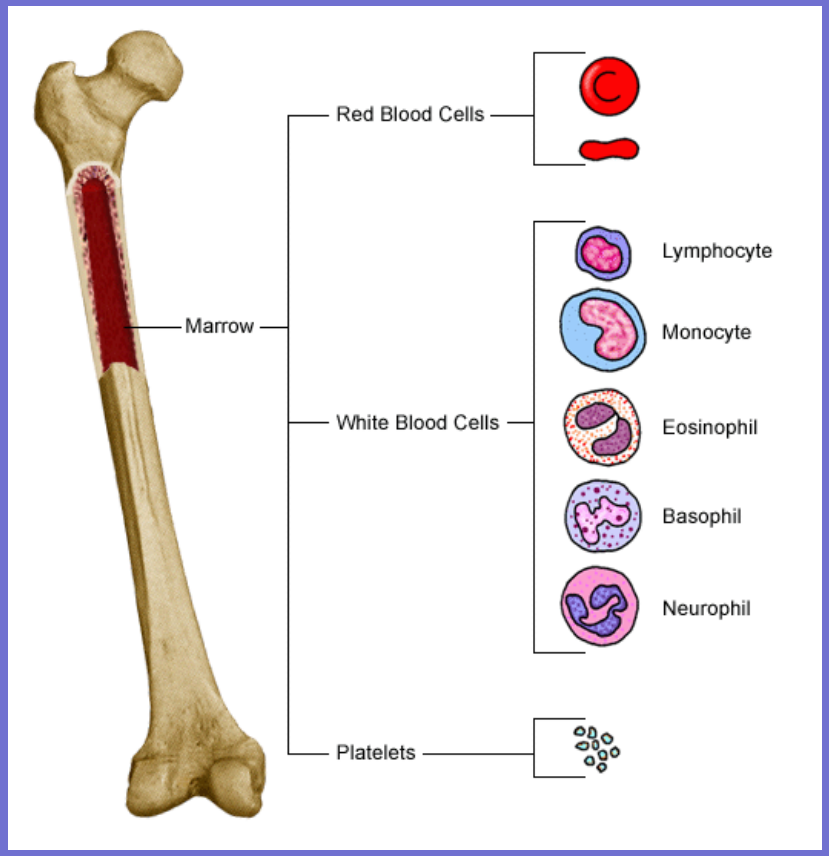
Blood Parts



- Blood cells
- Plasma



Blood Cells



Red blood cells – carries oxygen from the lungs to the cells.

White blood cells – fight infection.

Platelets – help with clotting.

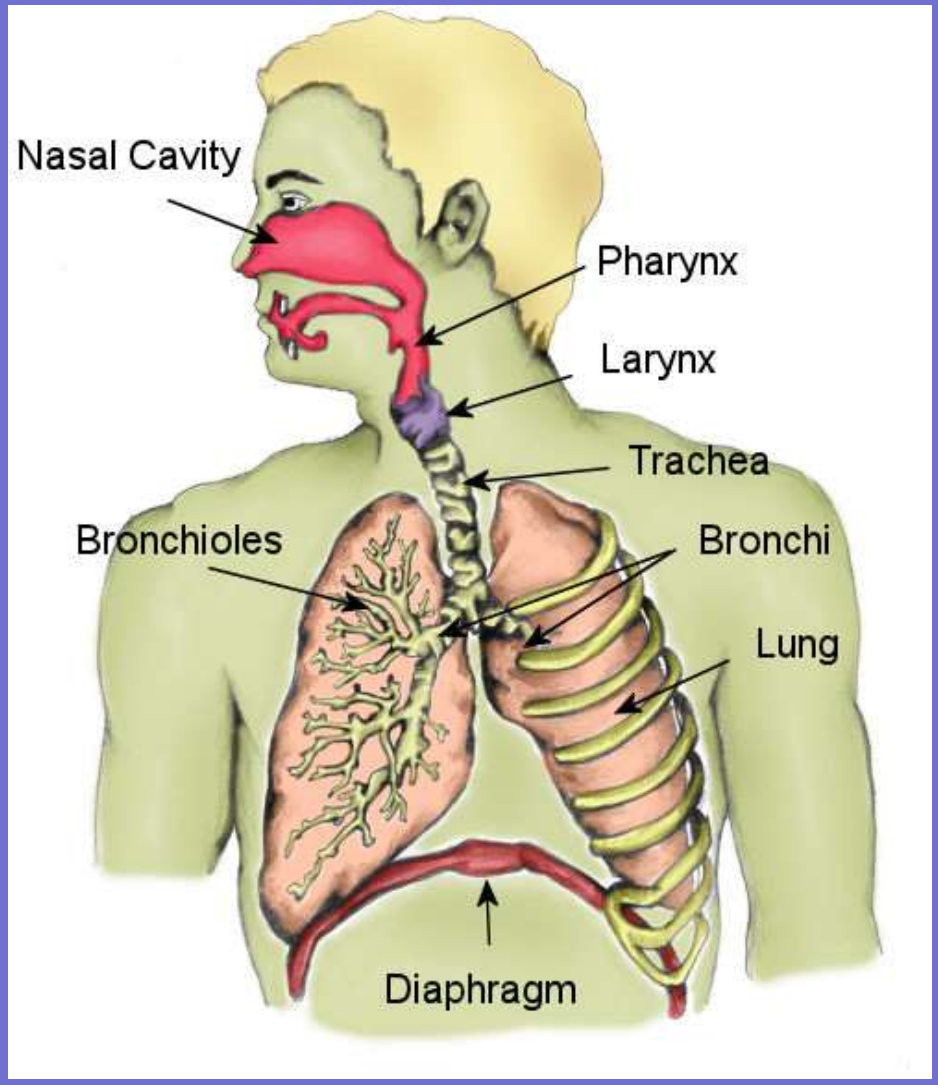
What do white blood cells do?

- They fight invaders and infection.

What do red blood cells do?

- They carry oxygen from the lungs to the cells of the body.

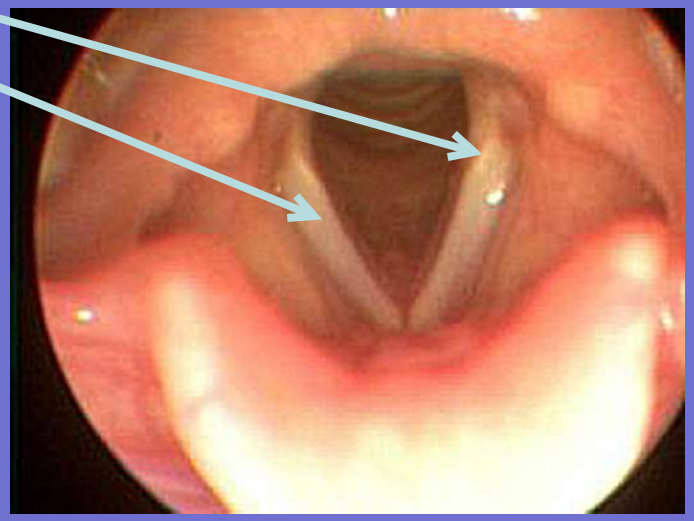
Respiratory System



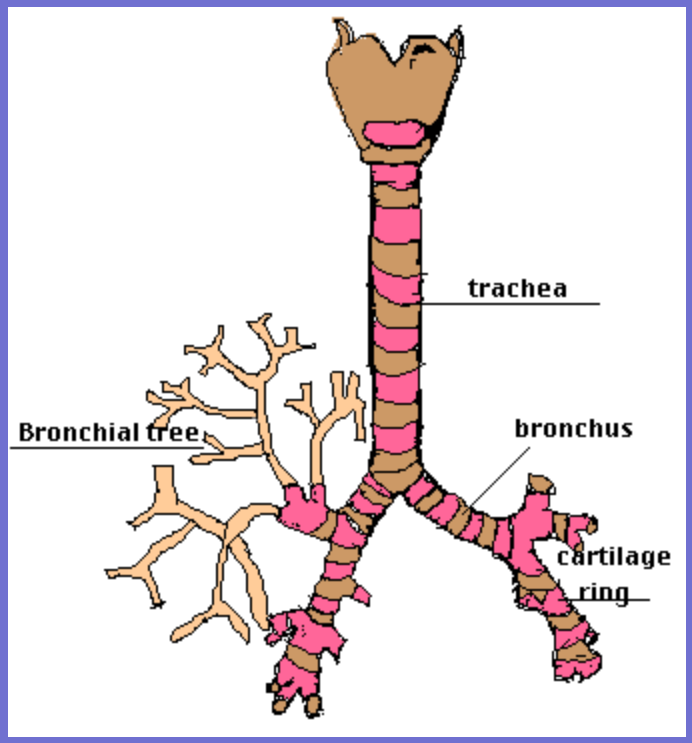
- Brings air into and out of the lungs.
- Allows oxygen and carbon dioxide to be exchanged between the blood and the air.
- Allows us to talk.

Larynx

- Commonly called your adam's apple or voice box.
- Holds your vocal cords



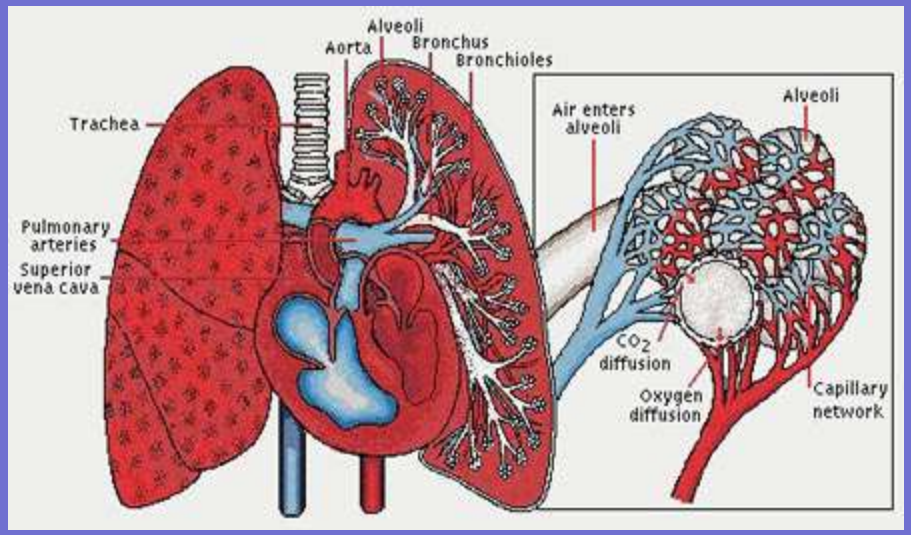
Trachea

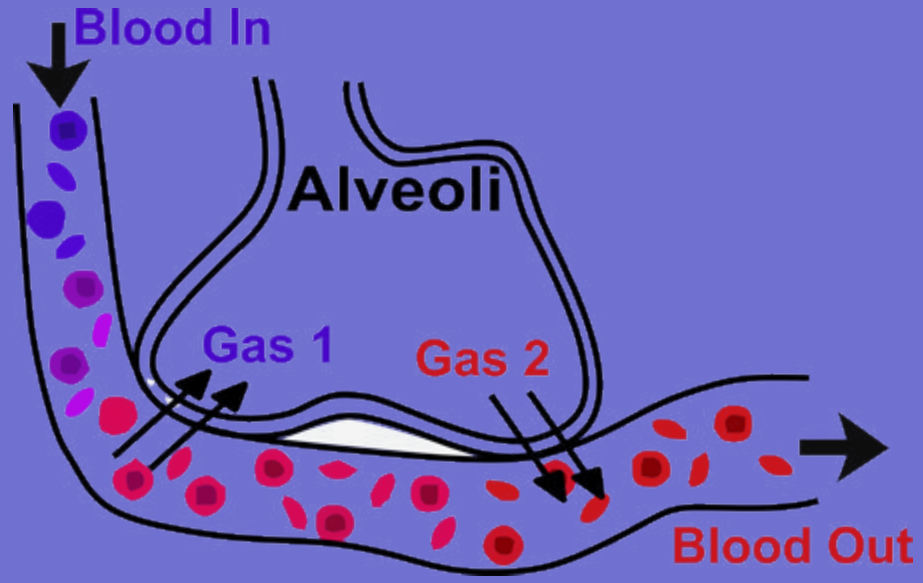


- Carries air from nose to lungs.
- Cartilage rings protect it from collapsing so that air can come through it.

Alveoli

- Al - ve – oh – li
- Little air filled sacs at the end of the “tree”, where oxygen moves into the blood.





Path of Oxygen

Nose/Mouth

Trachea

Lungs >> Alveoli

Alveoli puts the oxygen into the blood

(Blood is the circulatory system)

The Excretory System

Function:

To remove waste from the body.

- Examples of waste:

1. Urine
2. Feces
3. Carbon dioxide
4. sweat

The Excretory System

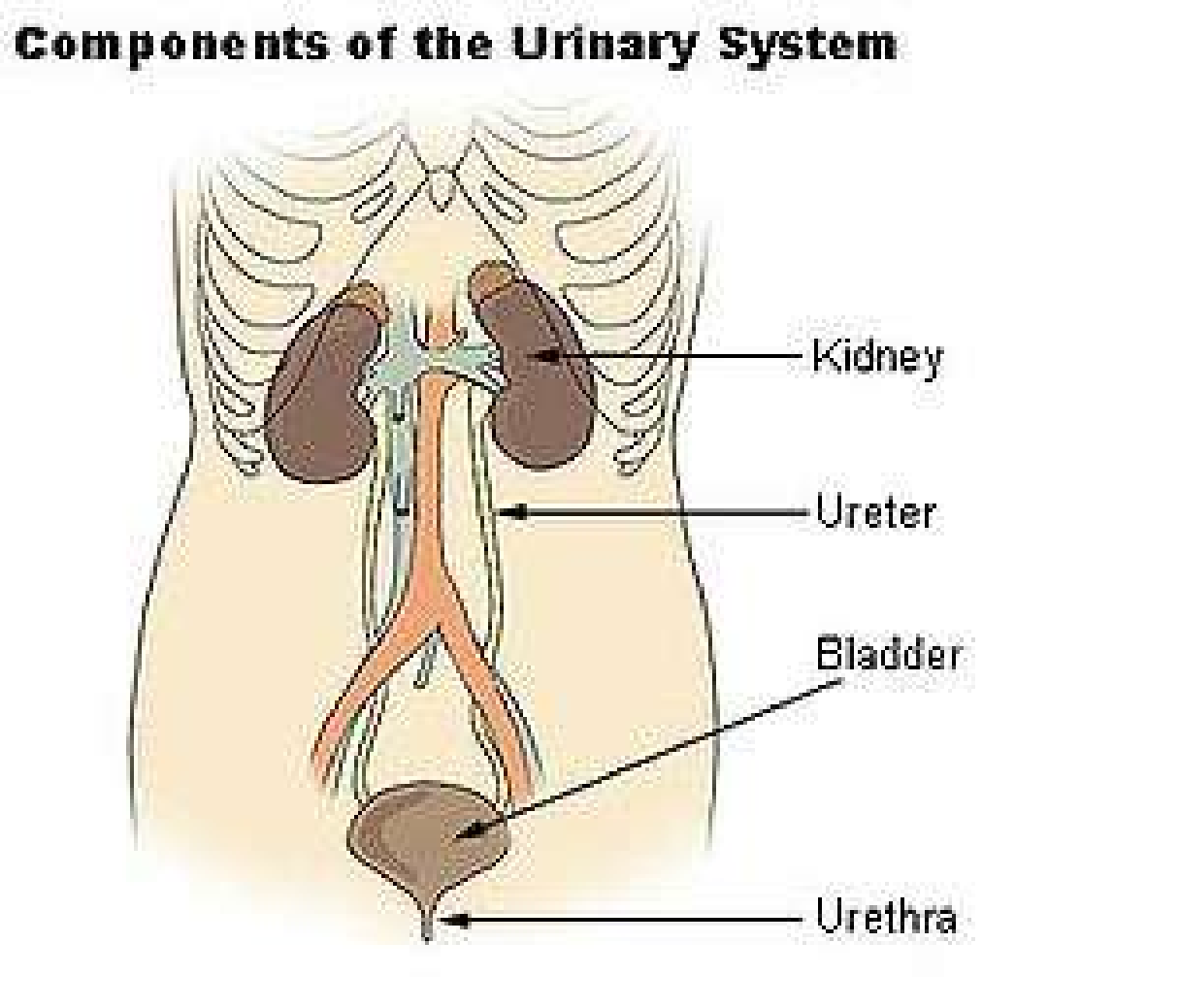
- What systems could are used in the Excretory System?

1. Digestive System
2. Respiratory System
3. Skin
4. Urinary System

The Excretory System

System	Excretion (What it puts out)
Digestive System	Undigested food
Respiratory System	Carbon Dioxide
Skin	Sweat (salts)
Urinary System (bladder, kidneys, ureters)	Excess water, salts, and other wastes

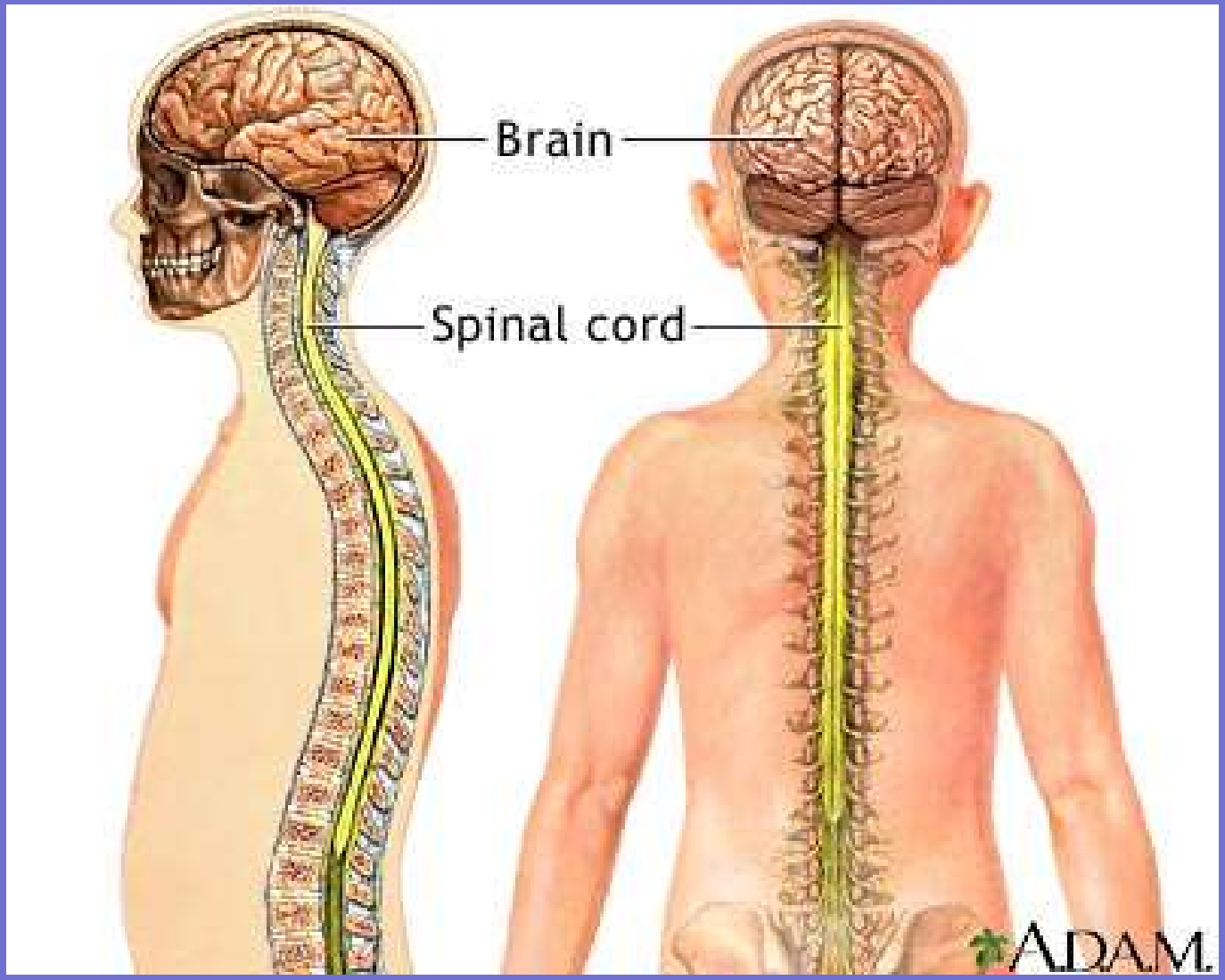
Excretory System



Excretory System

- What tissue/organs are part of it?
  - Kidneys- 2 bean-shaped organs that filter blood, producing urine.
  - Ureters- tubes that lead from each kidney to the bladder
  - Bladder- elastic, muscular organ that holds urine until it leaves the body.
  - Urethra- carries urine from the bladder to outside the body.
  - Liver- also filters blood to remove waste

Nervous System



Nervous System Organs

- Brain
- Spinal Cord
- Nerves

Nervous System

Functions:

- Control and coordinates the other systems
- Allows your body to adjust to changing stimuli

Stimuli

Stimuli- something your body senses and then responds to.

Examples:

- External: Noise, light, smell, temperature
- Internal: Chemical substances such as hormones

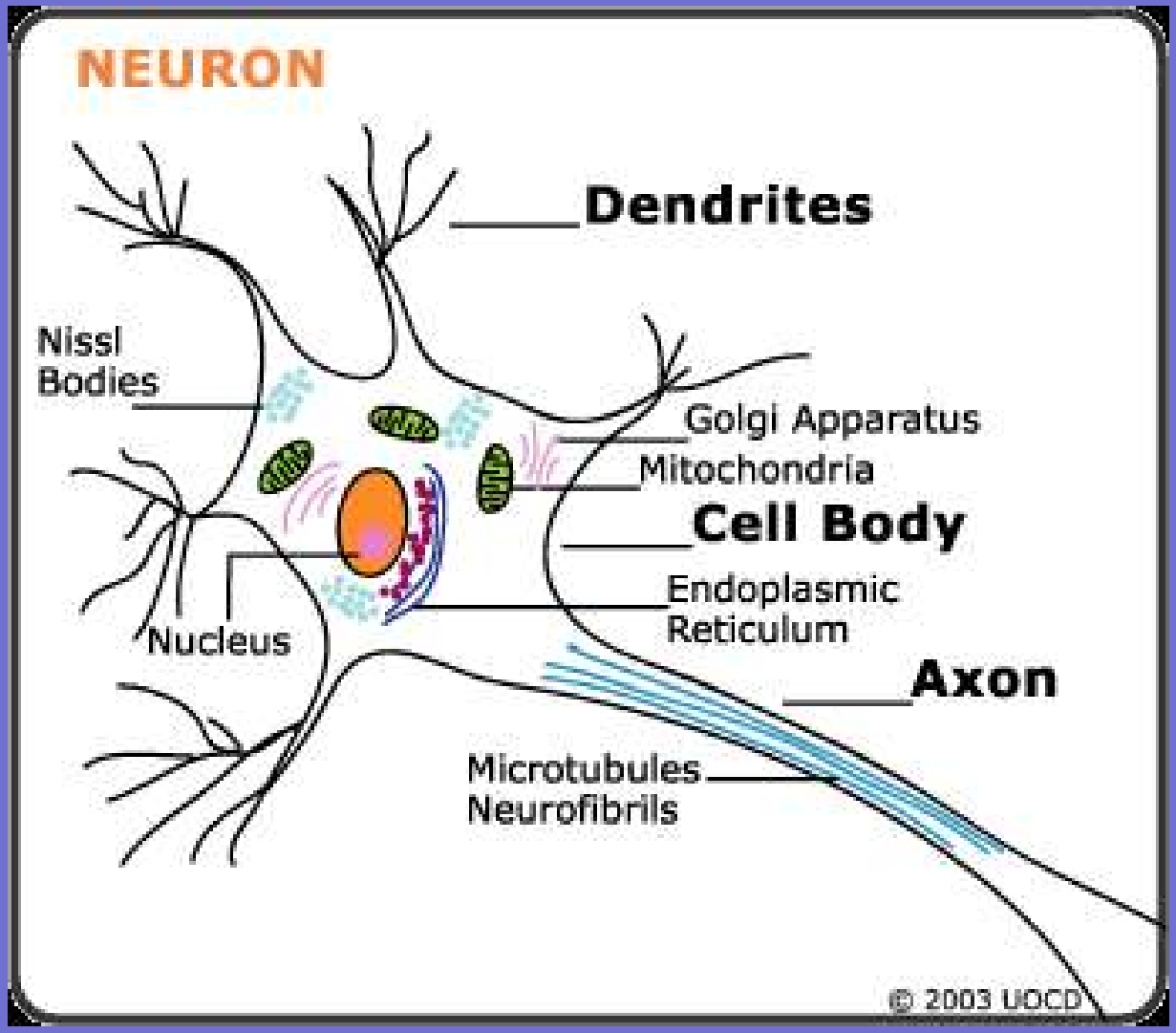
Homeostasis

Homeostasis- internal control and balance of the body.

Examples:

- regulation of breathing
- heartbeat
- digestion

Nerves cells = neurons

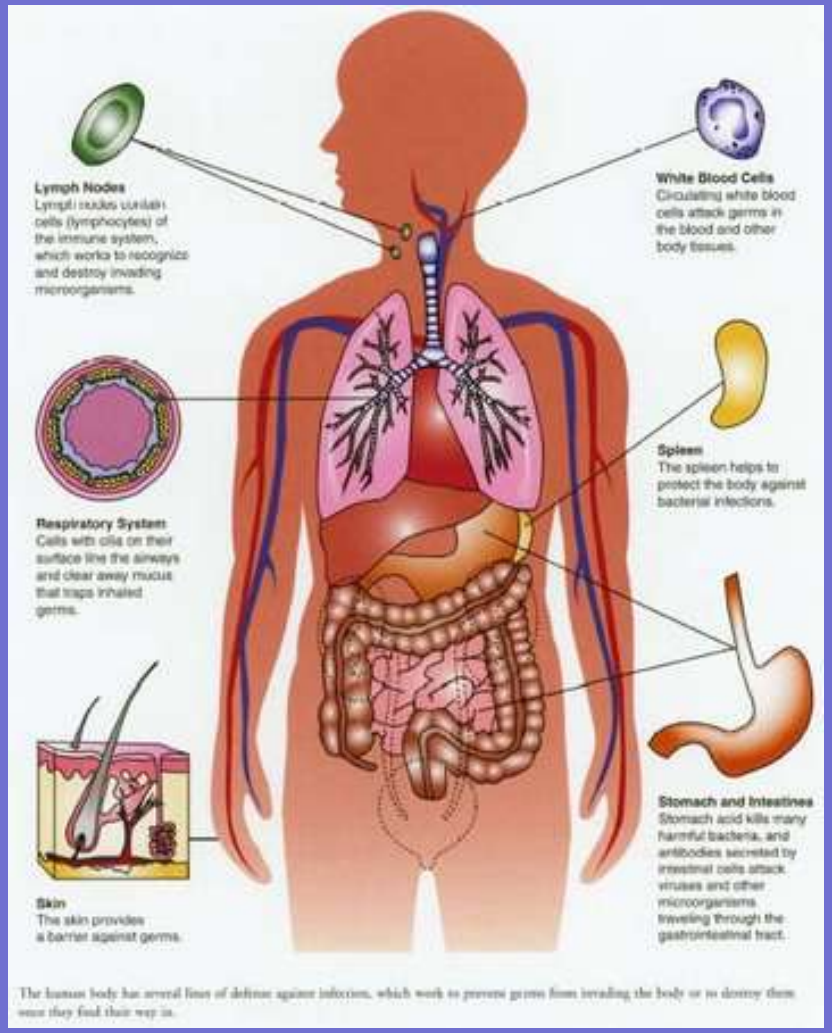


Brain

Immune System

Function –

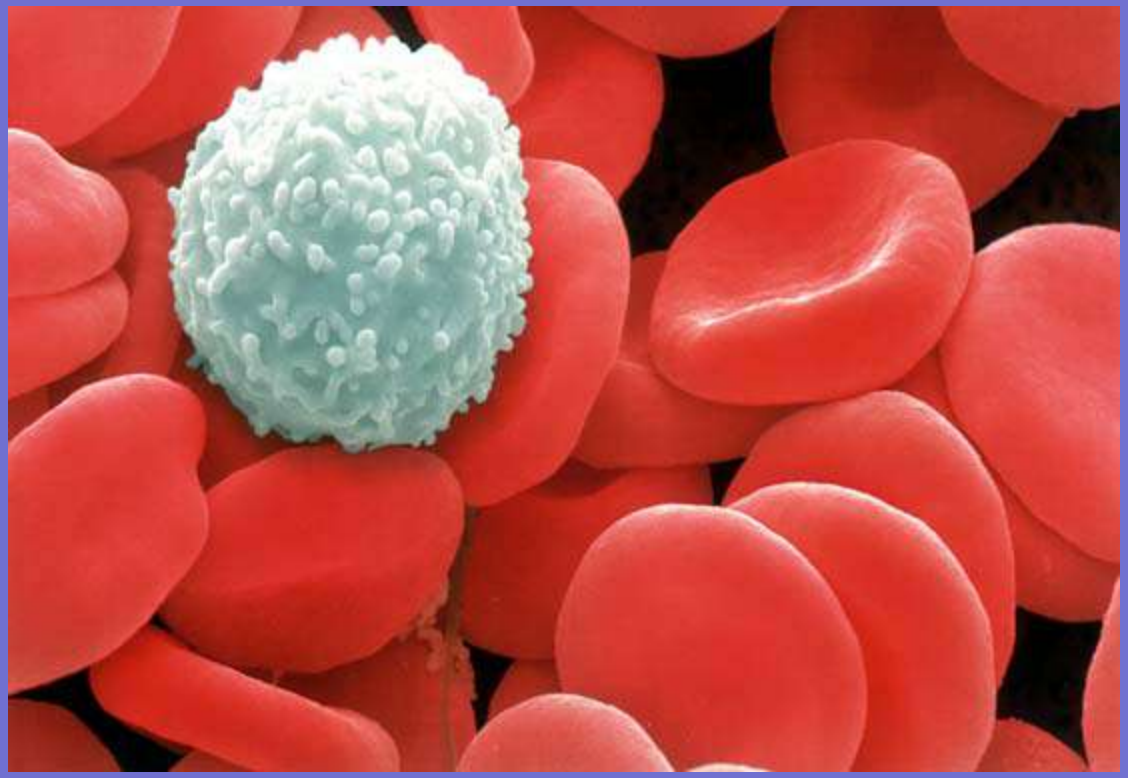
Keeps the body healthy and destroys invaders.



Immune System

White blood cells – attack invaders.

- Make antibodies.
- "Eat" germs



Reproductive System

Function:

To reproduce and make offspring (babies)

Organs:

Ovaries, Testies