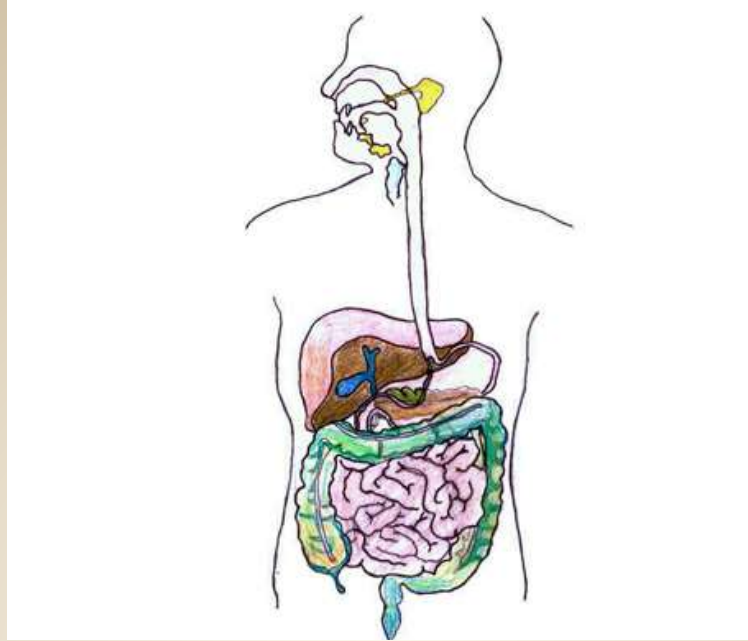


# Human Body Systems

On-Level Biology Book: Chapters 34 – 39

Pre-AP Biology Book: Chapters 35 - 40



# Digestive System

On-Level Biology Book: Pages 917 – 928

Pre-AP Biology Book: Pages 970 - 984

# Purpose

The Digestive System converts food into simpler molecules that can be used by cells; absorbs food; eliminates waste

The entire digestive process takes between 24 and 33 hours

# Organs/Components

- Mouth

- The first stop in the disassembly of your food;  
Mechanical digestion = chewing and  
Chemical digestion = enzymes found in saliva

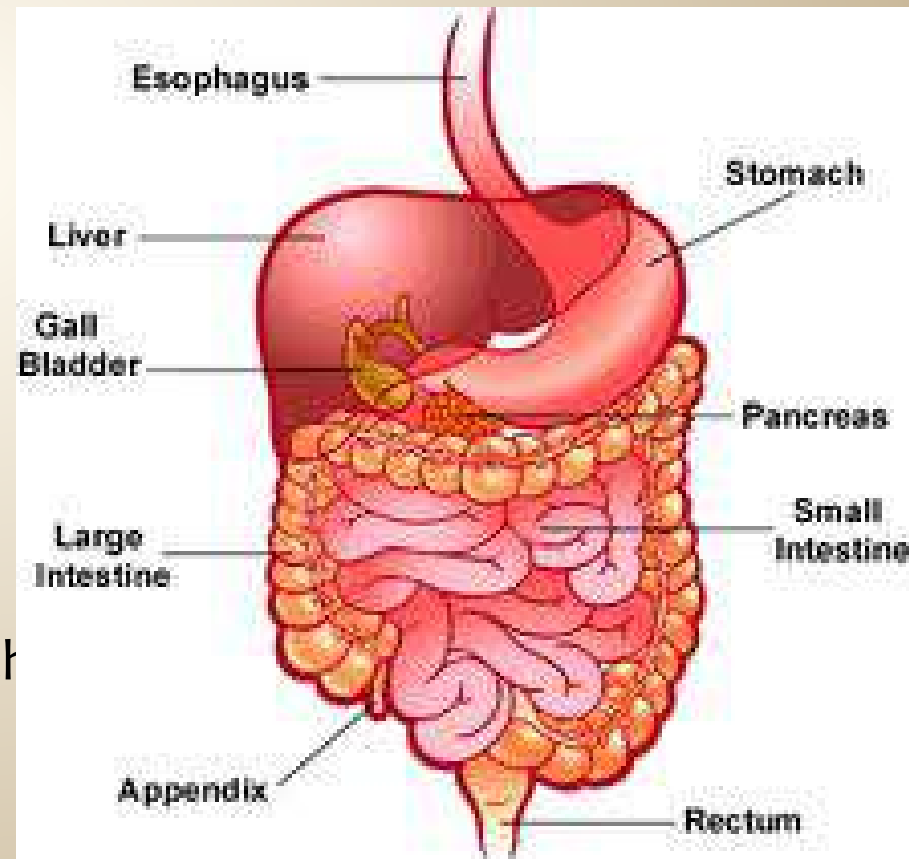
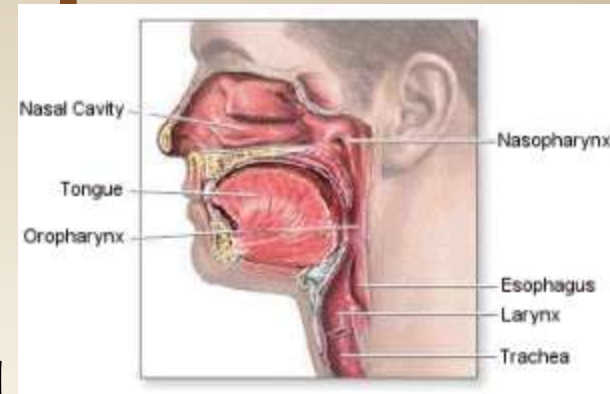
- Pharynx (throat)

- Epiglottis

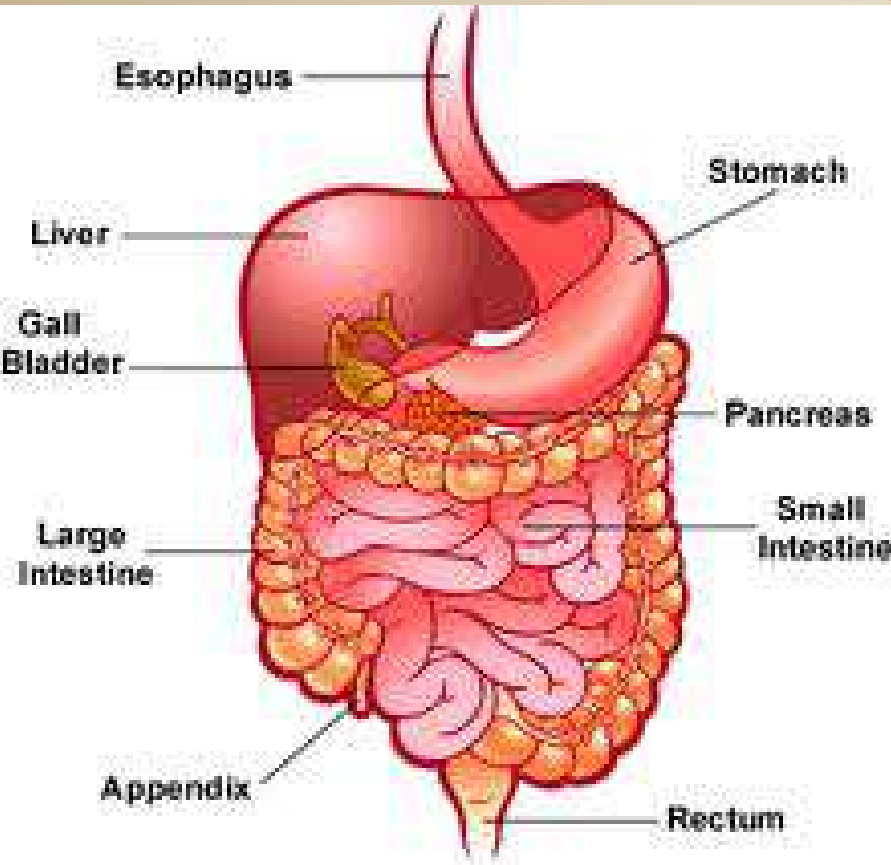
- Small flap that closes over the opening of the respiratory system when swallowing, preventing food from entering the airway.

- Esophagus

- Muscular tube connecting the mouth to the stomach



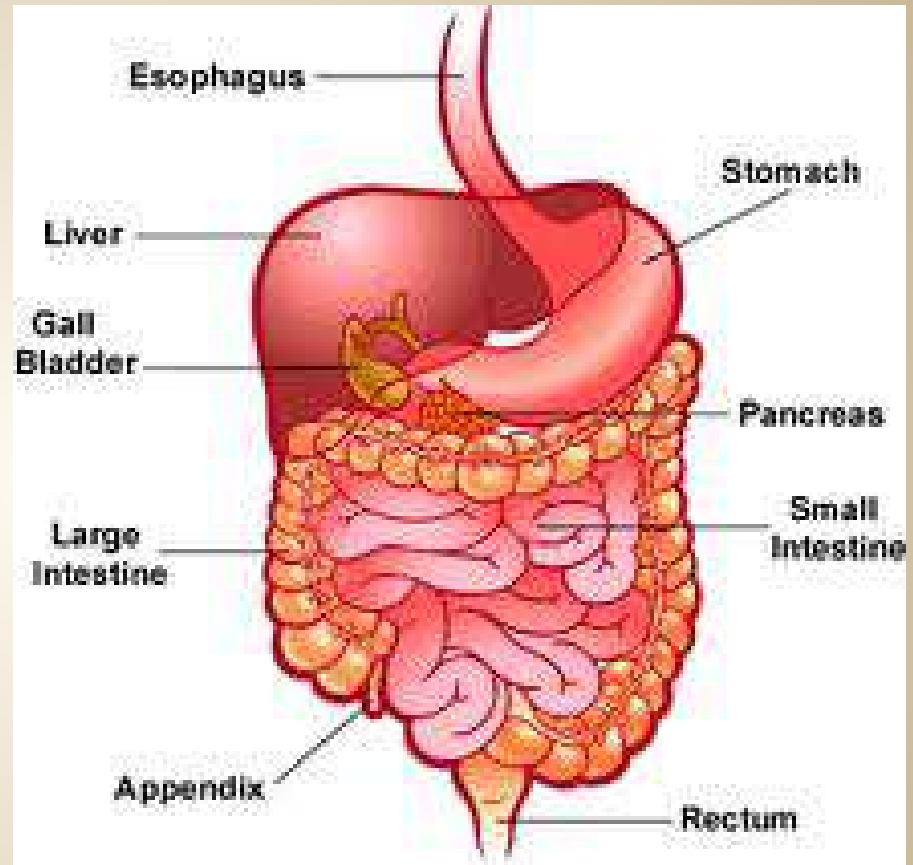
# Organs/Components



- **Liver**
  - Produces bile, a substance that helps break down fats
- **Gall Bladder**
  - Stores bile produced by the liver
- **Stomach**
  - Muscular pouch like organ where involuntary muscular churning and chemical digestion occurs
- **Pancreas**
  - Secretes enzymes to help break down carbohydrates, proteins and fats
- **Small Intestine**
  - Narrow muscular tube where digestion of food is completed with the help of enzymes secreted by the liver and pancreas

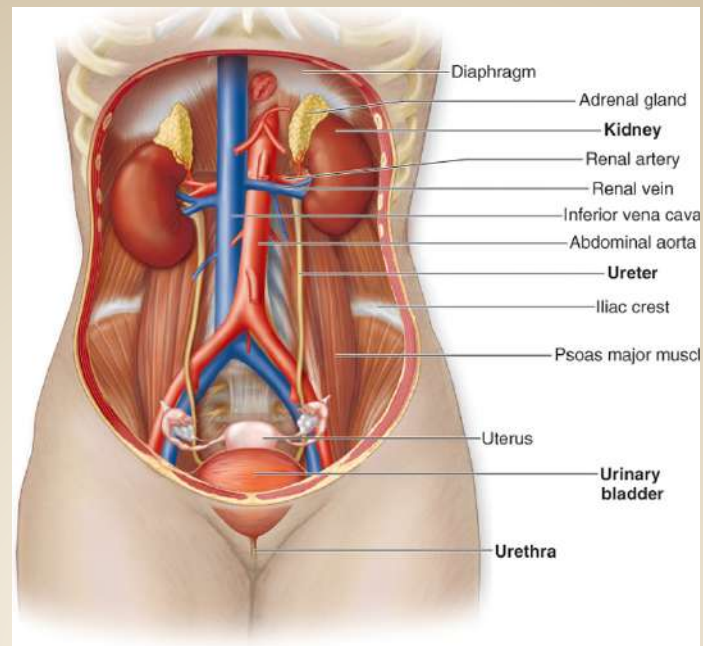
# Organs/Components

- Villi (plural: Villus)
  - Little projections in the lining of the small intestine that function in the absorption of digested food
- Large Intestine (colon)
  - Muscular tube where water and salts are absorbed; material spends 18-24 hours here
- Appendix
  - Tube like extension off of the large intestine
- Rectum
  - The last part of the digestive system, feces are eliminated from the rectum through the anus



# How Does this System Relate to others?

- Muscular – contains smooth muscle
- Nervous – gets signals that control the rate of digestion
- Circulatory – broken down food travels through blood vessels to cells
- Endocrine – hormones (ex. Insulin) control blood sugar levels



# Excretory System

On-Level Biology Book: Pages 985 – 991

Pre-AP Biology Book: Pages 985 - 995

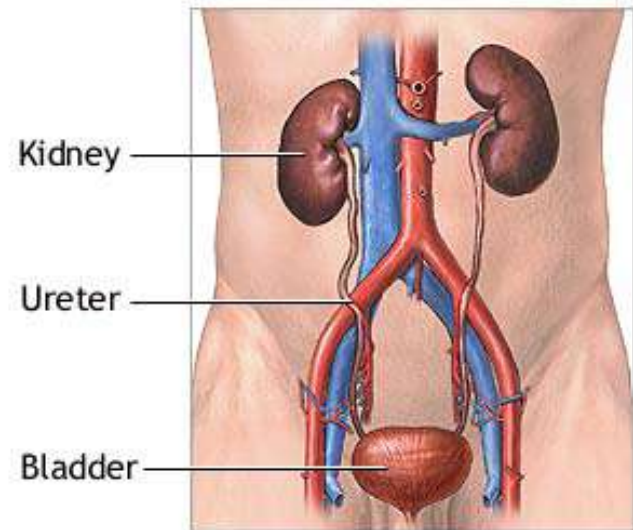
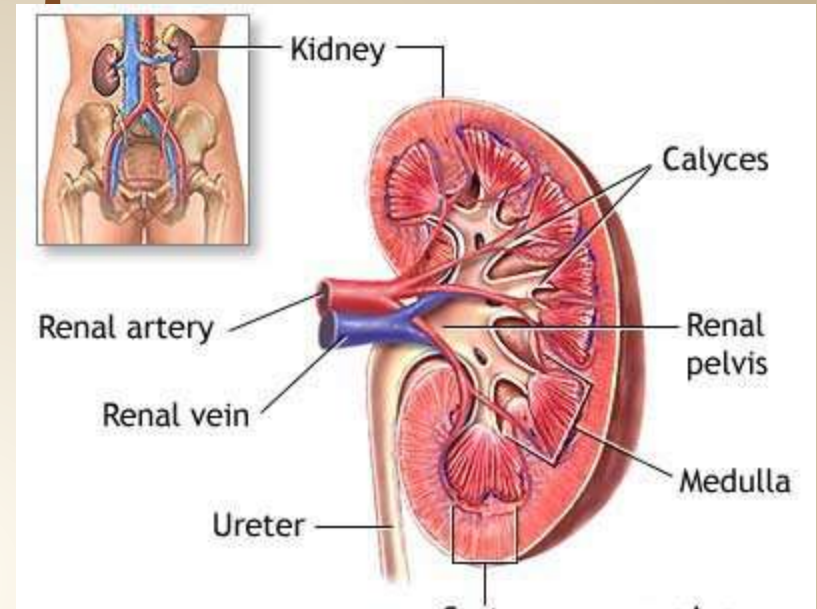


# Purpose

The Excretory  
System eliminates  
waste products from  
the body

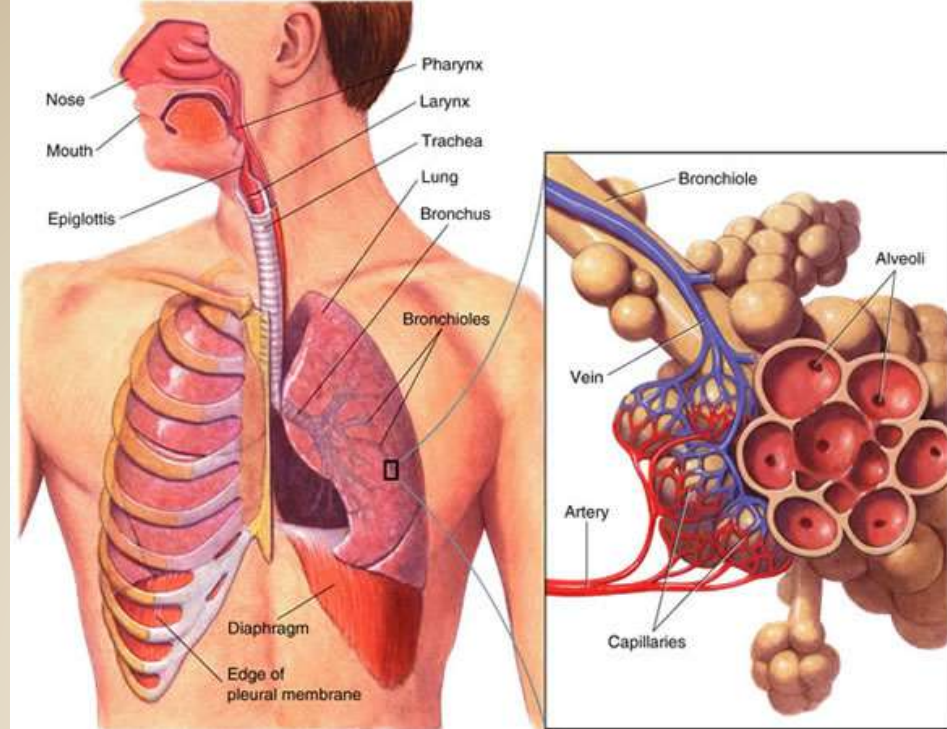
# Organs/Components

- **Kidneys**
  - Help maintain homeostasis by filtering blood to remove waste
- **Nephron**
  - Tiny filter that makes up the kidney, there are millions
- **Ureters**
  - Tubes connecting the kidneys to the bladder
- **Urinary Bladder**
  - Smooth muscle bag that stores a solution of wastes called urine
- **Urethra**
  - Tube where urine passed out of the body
- **Skin**
- **Lungs**



# How Does this System Relate to others?

- Circulatory – waste products are carried from the cells to the kidney through blood vessels
- Endocrine – hormones are sent that control water levels and homeostasis
- Respiratory – expels toxic CO<sub>2</sub> out of body



# Respiratory System

On-Level Biology Book: Pages 971 – 974

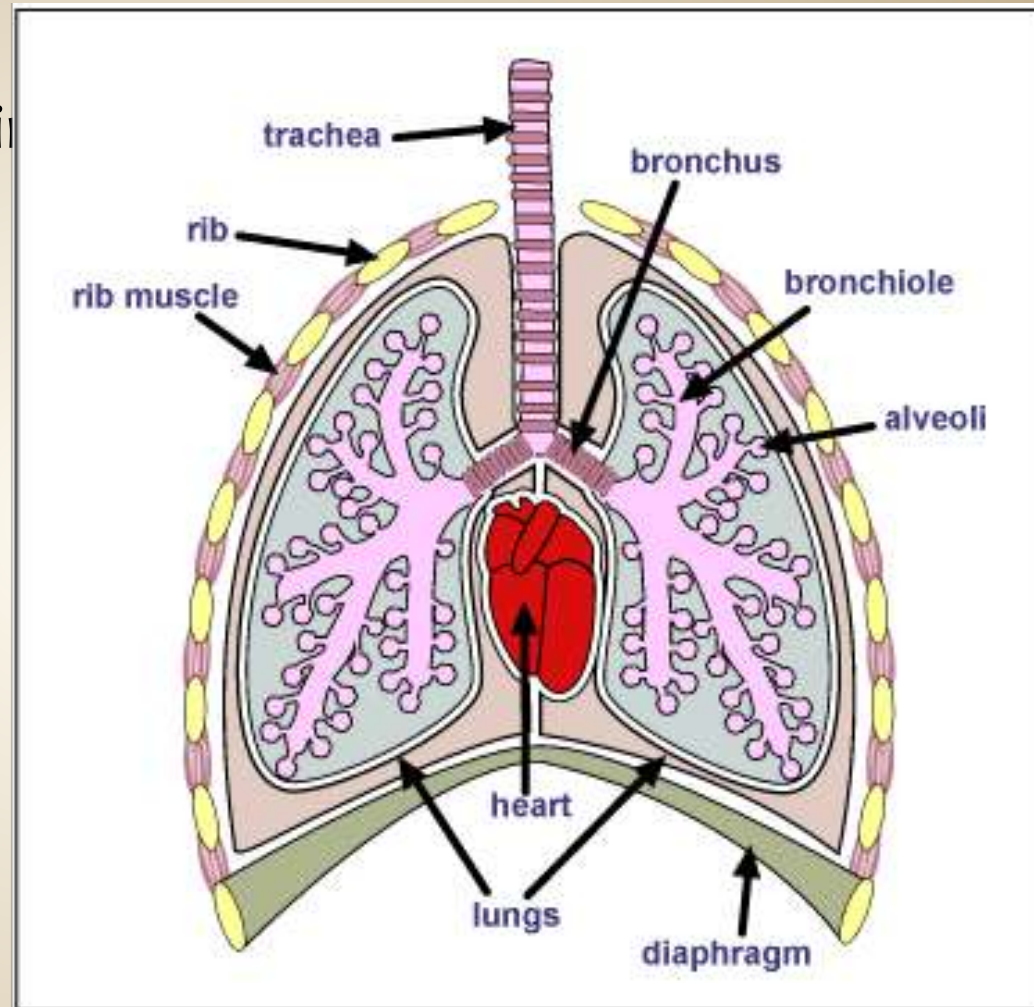
Pre-AP Biology Book: Pages 956 - 969

# Purpose

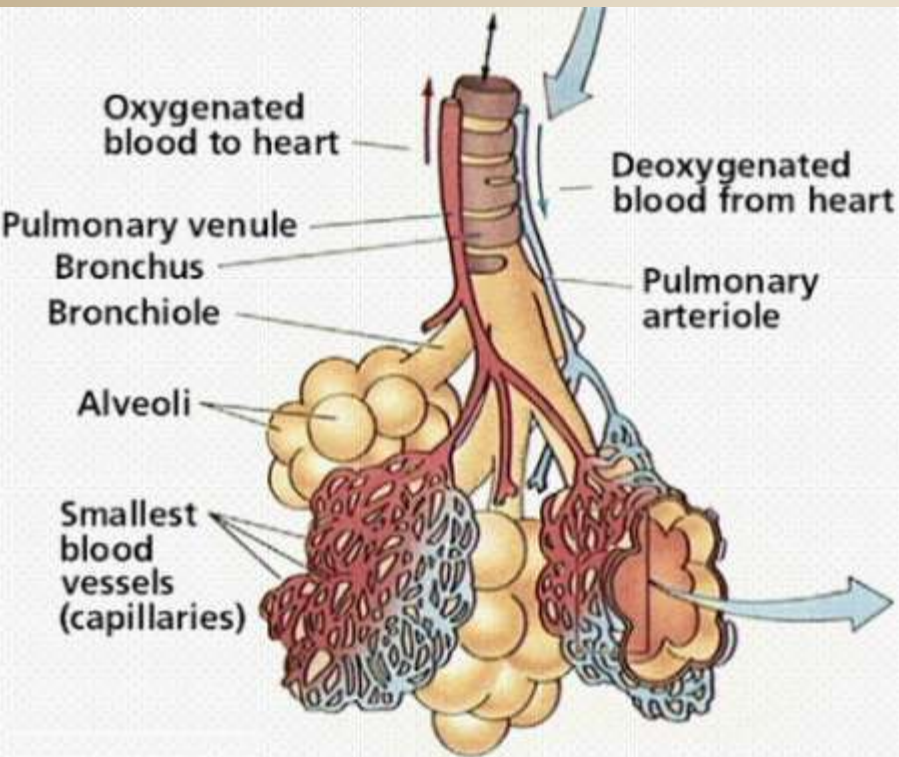
The Respiratory System provides oxygen needed for cellular respiration and removes carbon dioxide from the body

# Organs/Components

- Nose and Mouth
  - Respiration begins with taking in air
- Pharynx (Throat)
- Larynx
  - Where your vocal cords are
- Trachea (Windpipe)
  - Passes air into the bronchi
- Bronchi (singular: Bronchus)
  - Passes air from trachea to the lungs



# Organs/Components



- **Bronchioles**

- Each Bronchus in the lungs branches out like a tree into bronchioles

- **Alveoli**

- Sacs at the end of the Bronchioles where oxygen and carbon dioxide are exchanged

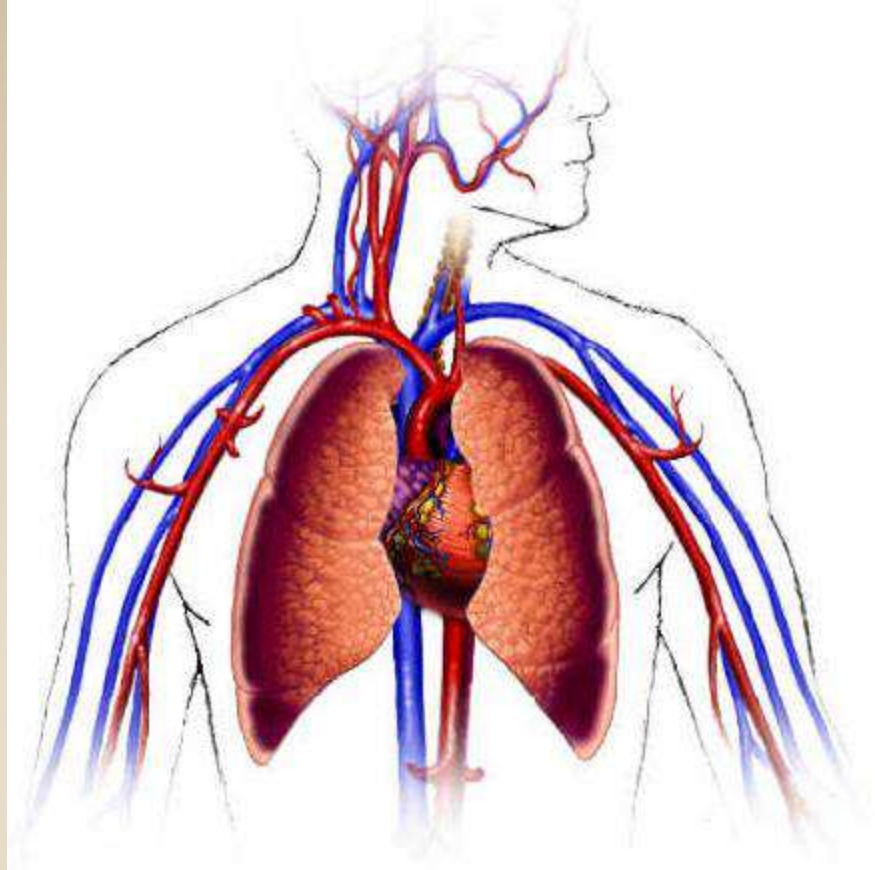
- **Diaphragm**

- Muscle that enables you to breathe

# How Does this System Relate to others?

- Circulatory – brings O<sub>2</sub> to the cells and CO<sub>2</sub> back to the lungs
- Excretory – part of the excretory system to get rid of toxic CO<sub>2</sub> from the body





# Circulatory System

On-Level Biology Book: Pages 975 – 984

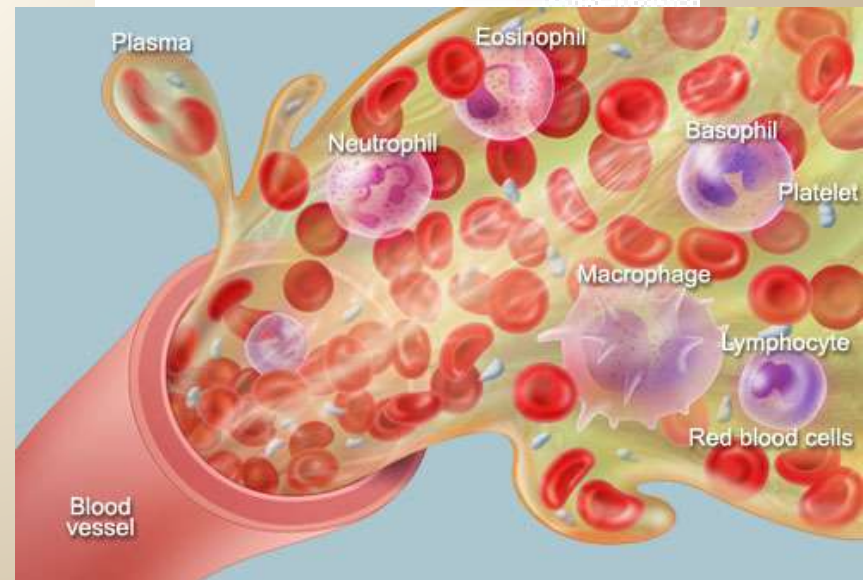
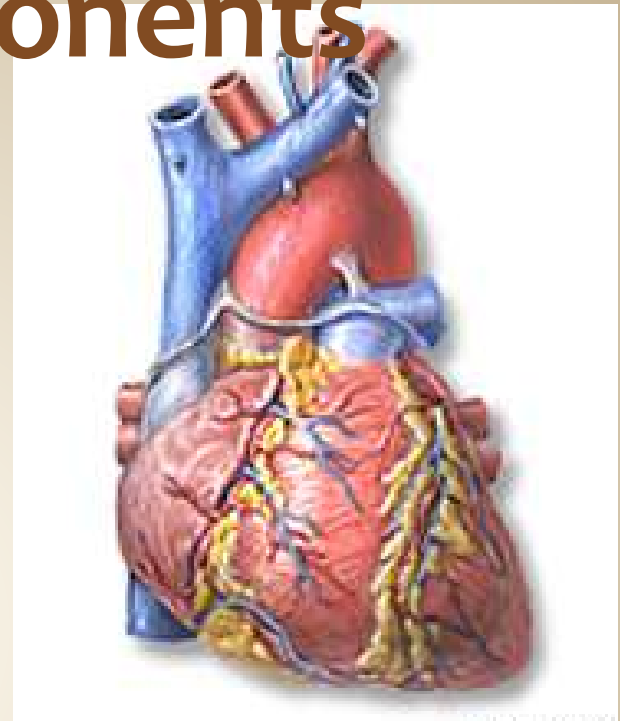
Pre-AP Biology Book: Pages 942 - 955

# Purpose

The Circulatory Systems brings oxygen, nutrients and hormones to cells; fights infections; removes cell wastes; regulates body temperature

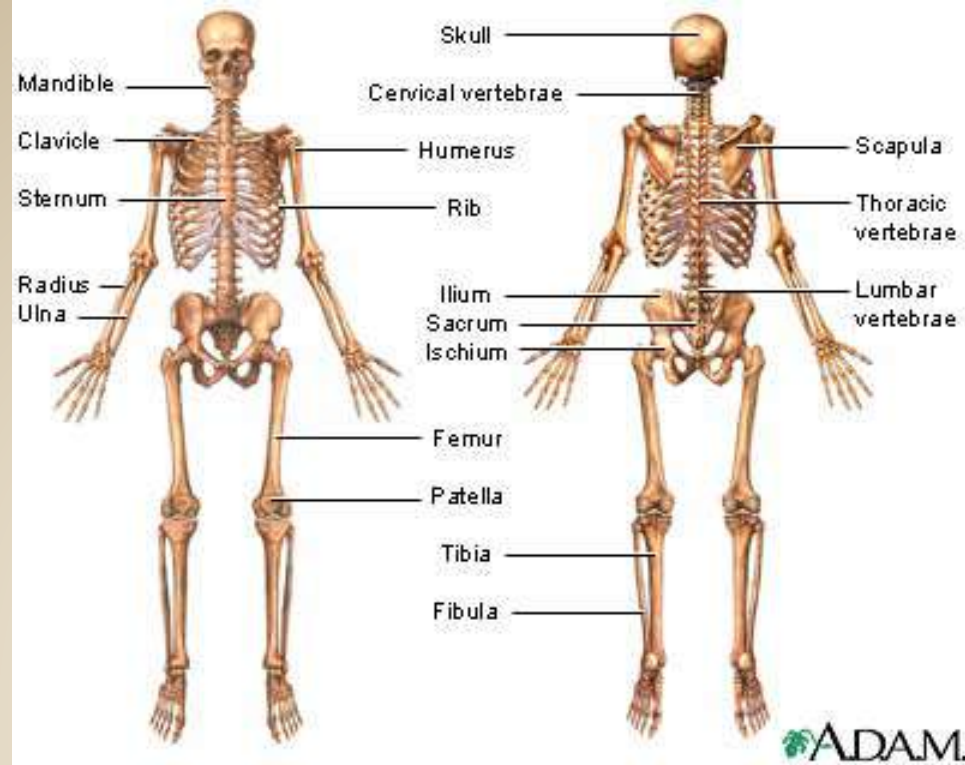
# Organs/Components

- Heart
  - The pump that keeps blood flowing through your body
- Blood Vessels
  - Arteries
    - Carry blood away from the heart
- Blood
  - Red Blood Cells
    - Carry oxygen to the body cells
  - White blood cells
    - Defend body against disease
  - Platelets
    - Cell fragments needed for blood clotting
  - Plasma
    - Fluid portion of the blood



# How Does this System Relate to others?

Connected to almost all other systems since the circulatory system carries oxygen to all cells



# Skeletal System

On-Level Biology Book: Pages 899 -904

Pre-AP Biology Book: Pages 920-925

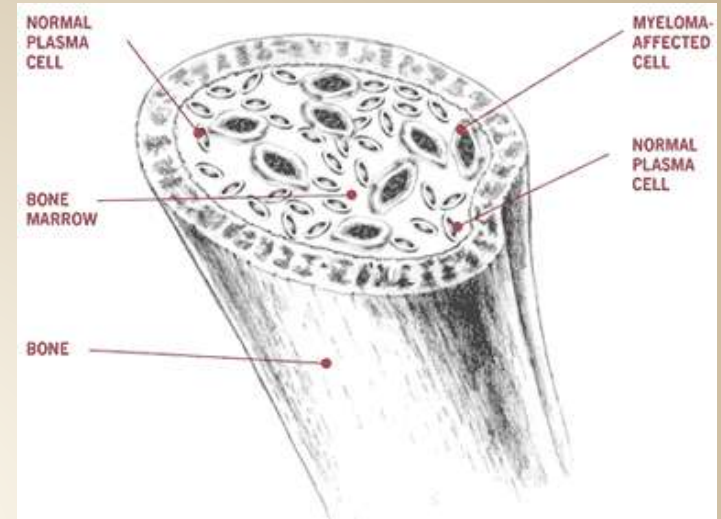
# Purpose

The Skeletal System  
supports the body; protects  
internal organs; allows  
movement; stores mineral  
reserves; provides blood  
cell formation

# Organs/Components

## ● Bones

- Produce blood cells
- Red Marrow
  - Produce red and white blood cells
- Yellow Marrow
  - Consists of stored fat



## ● Joints

- Found where two (2) bones meet

## ● Cartilage

- Surrounds the end on bone to prevent grinding upon another bone

## ● Ligaments

- Tough band of tissue attaching one bone to another

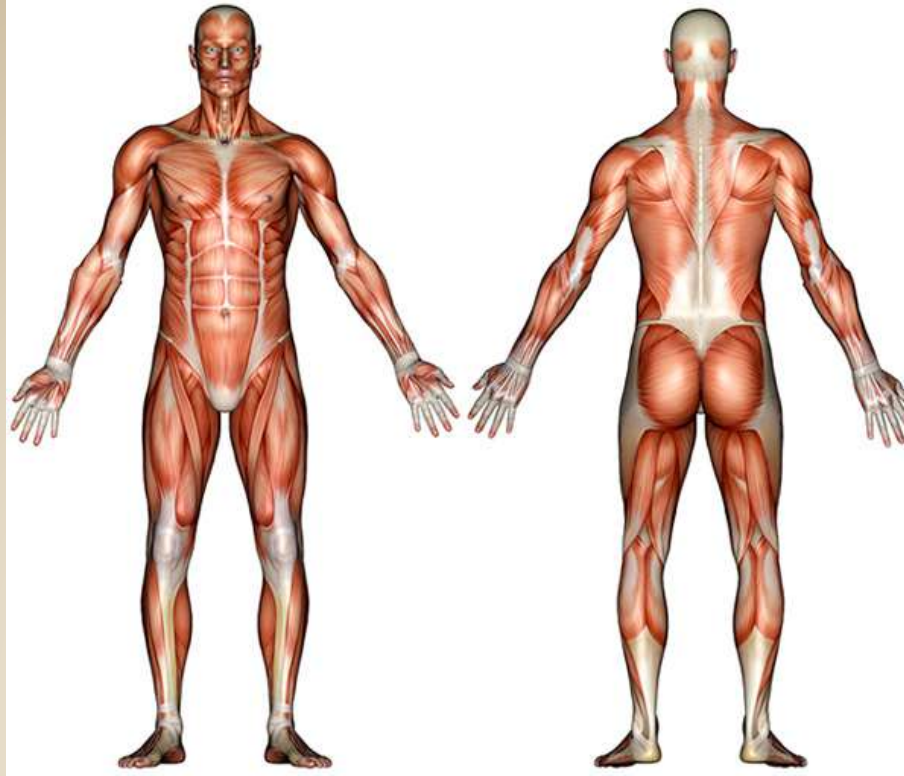
## ● Tendons

- Thick bands of tissue connecting muscle to bone

# How Does this System Relate to others?

- Muscular system – bones and muscles work together for movement
- Circulatory system and immune system – all blood cells (red and white) are made in the bone marrow





# Muscular System

On-Level Biology Book: Pages 905 – 913

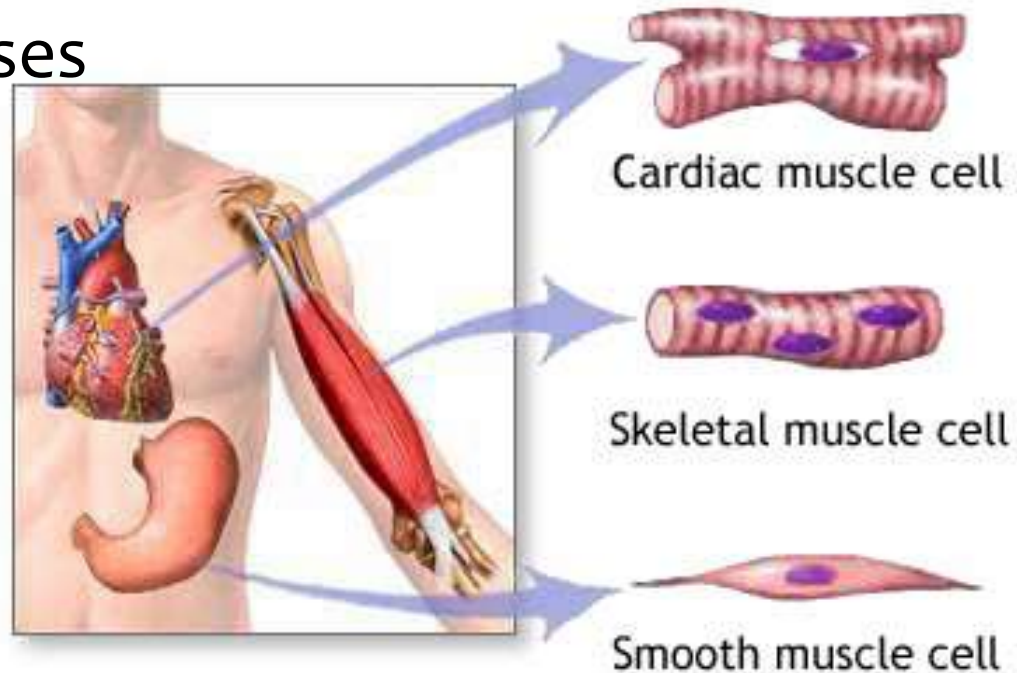
Pre-AP Biology Book: Pages 926 - 932

# Purpose

The Muscular System  
produces voluntary  
movement; circulates  
blood, moves food  
through digestive system

# Organs/Components

- **Cardiac Muscle**
  - Makes up your heart, is adapted to generate and conduct electrical impulses
- **Skeletal Muscle (voluntary muscle)**
  - Attaches to and moves bones
- **Smooth Muscle (involuntary muscle)**
  - Found on walls of internal organs and blood vessels



# How Does this System Relate to others?

- Works closely with the:
  - skeletal system
  - Circulatory – brings O<sub>2</sub> to muscles and waste products such as lactic acid away
  - Nervous – how muscles contract

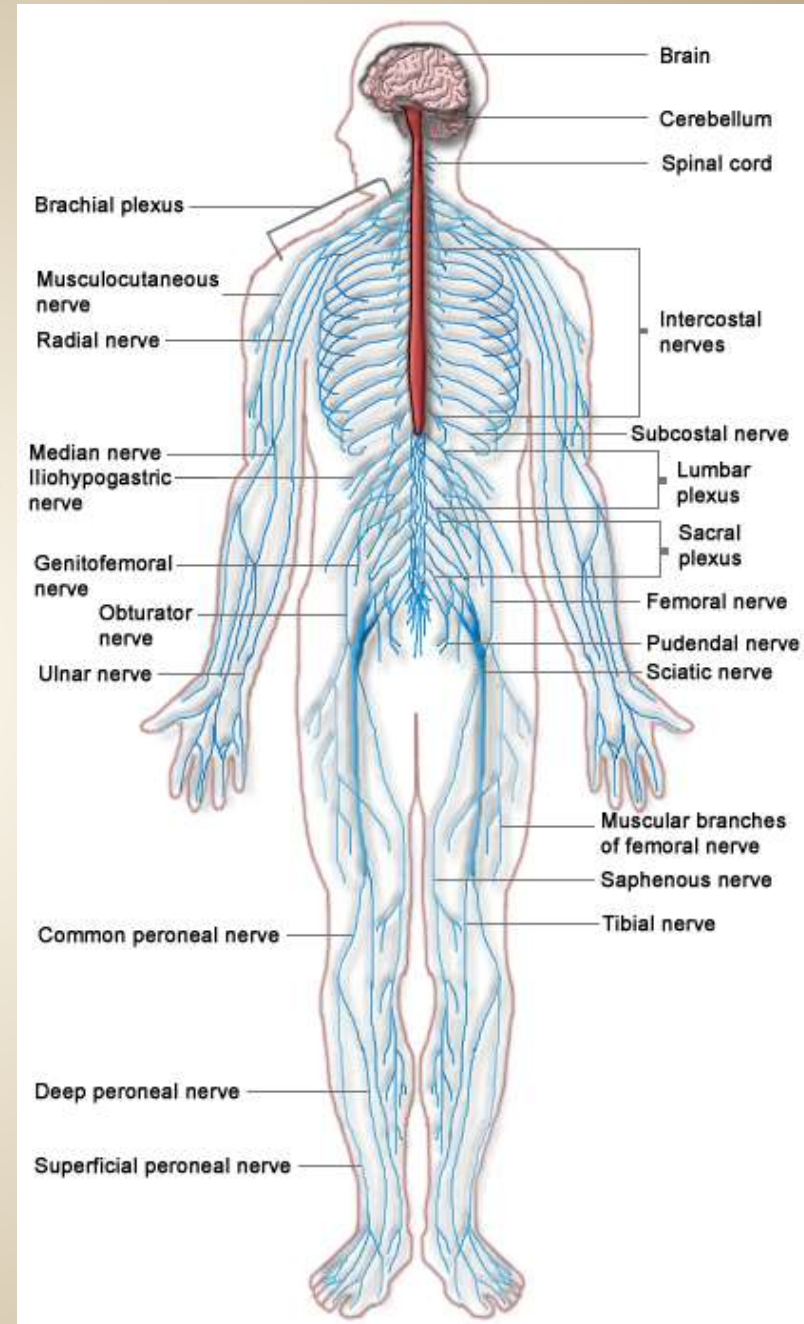
# Nervous System

On-Level Biology Book: Pages

943 – 950

Pre-AP Biology Book: Pages

890 - 919

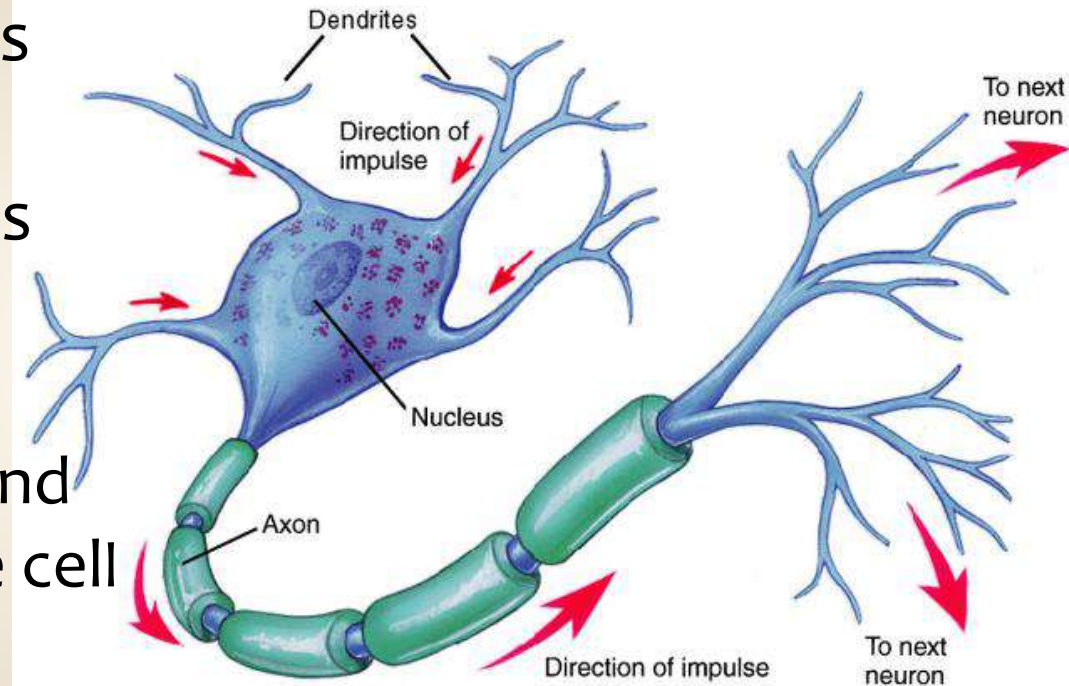


# Purpose

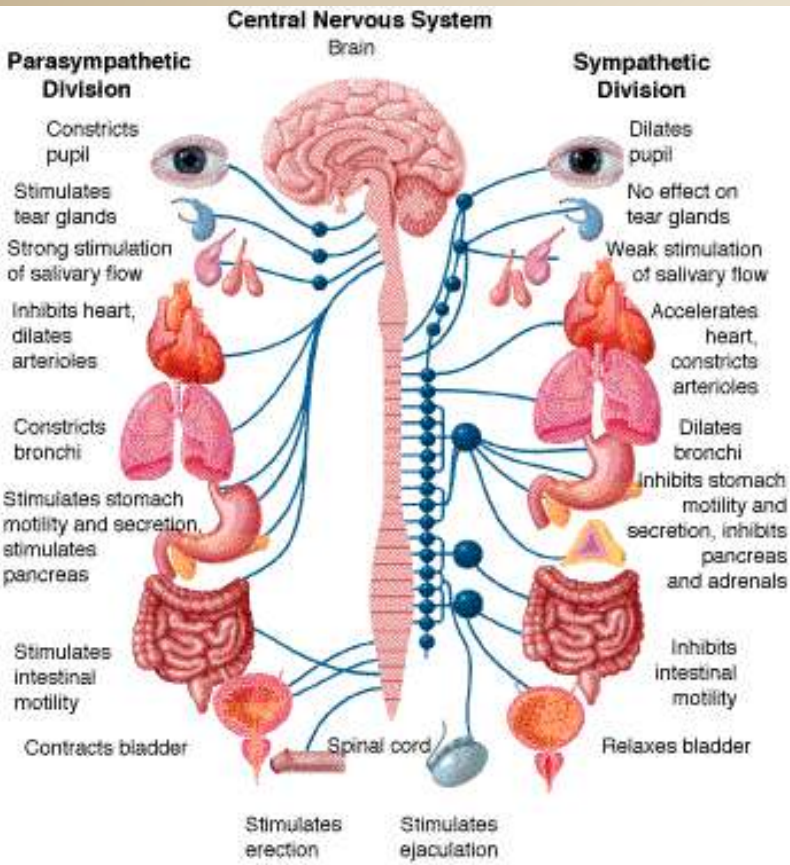
The Nervous System recognizes and coordinates the body's response to changes in its internal and external environments

# Organs/Components

- Neurons (Nerve Cells)
  - Basic unit of structure and function of the nervous system
  - Long cell with 3 regions
    1. Cell body
    2. Dendrites
      - Receive impulses and deliver them to the cell
    3. Axon
      - Extension of the neuron that carry impulses away from the cell



# Organs/Components

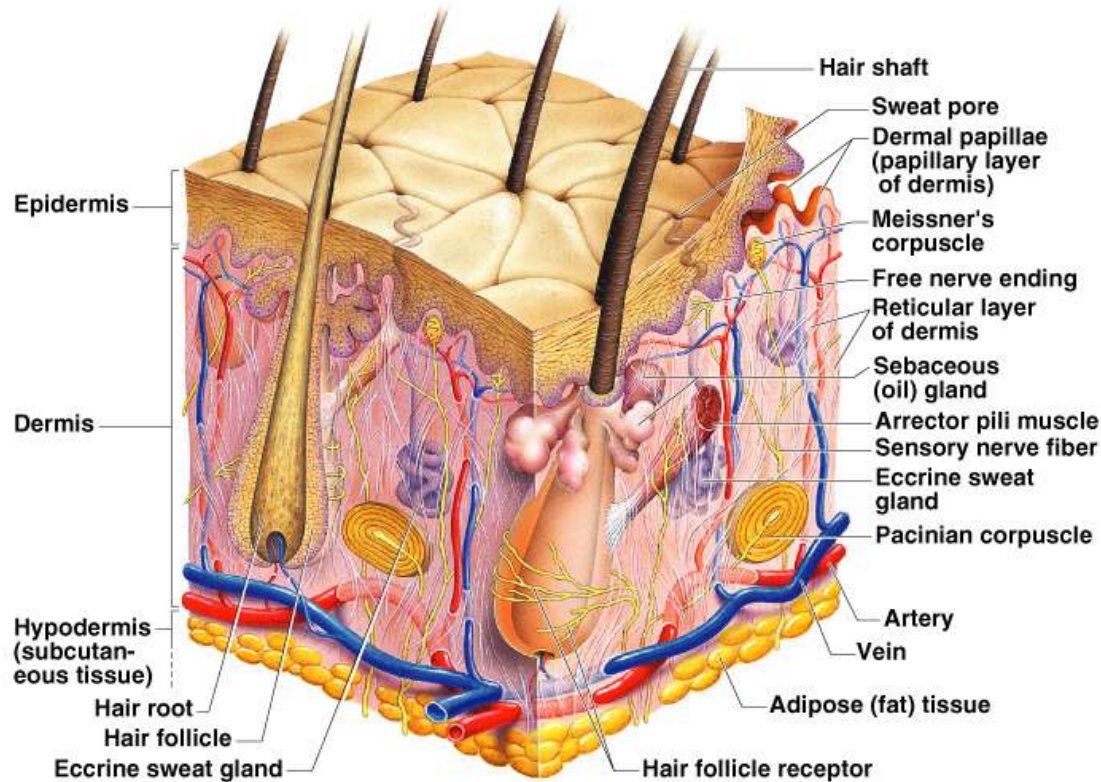


- Brain
  - Control center
- Spinal Cord
- Central Nervous System
  - Made up of the brain and spinal cord and coordinates your body's activities
- Peripheral Nervous System
  - Made up of the nerves which carry messages to and from the central nervous system



# How Does this System Relate to others?

- The nervous system works with many other systems, but works closely with the:
  - Digestive system
  - Muscular system



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# Integumentary System

On-Level Biology Book: Pg 893 – 898

Pre-AP Biology Book: Pages 933 - 941

# Purpose

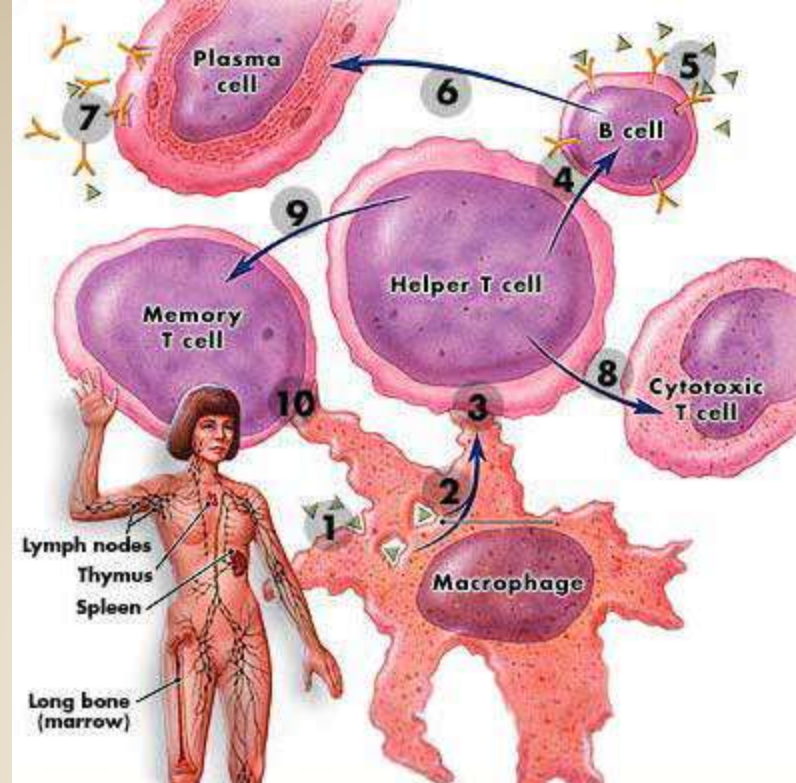
The Integumentary System  
is the barrier against  
infections and injury;  
regulates body  
temperature; protects  
against ultraviolet radiation

# Organs/Components

- Skin
  - Epidermis: outermost layer of skin
    - covers the surfaces of the body
  - Dermis: inner layer of skin
    - Contains blood vessels, nerve cells, hair follicles, sweat and oil glands
- Hair, Skin and Nails
  - Made up of Keratin
- Pigment of skin and hair
  - Controlled by melanin
- Sweat
  - Produced to help maintain homeostasis
- Oil Glands

# How Does this System Relate to others?

The integumentary  
contains blood vessels  
and nerves



# Immune System

On-Level Biology Book: Pages 1022 – 1045

Pre-AP Biology Book: Pages 1030 - 1059

# Purpose

The Immune System helps protect the body from disease; collects fluid lost from blood vessels and return it to the circulatory system

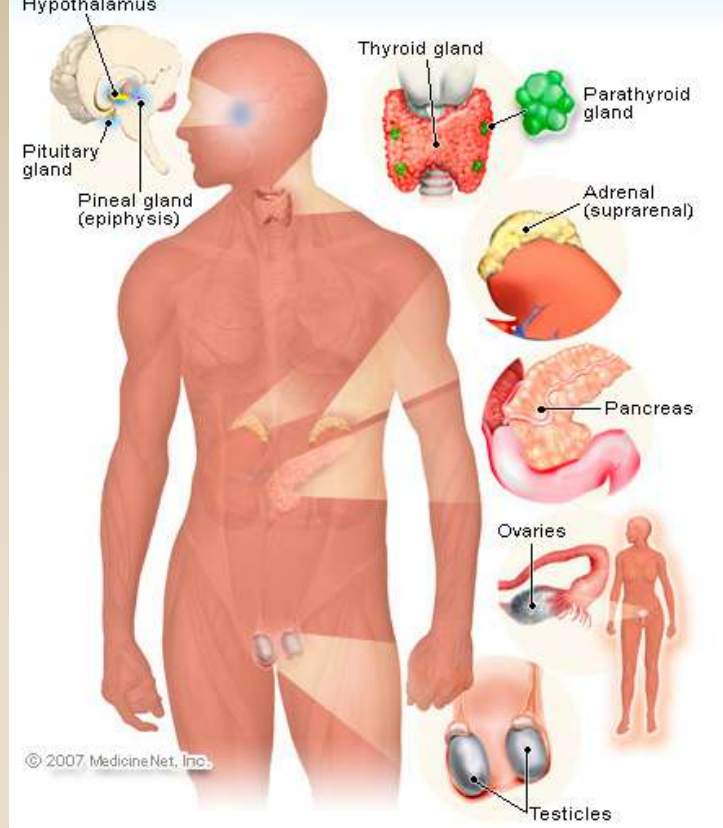
# Organs/Components

- White Blood Cells
- Thymus
- Spleen
- Lymph Vessels
- Lymph Nodes



# How Does this System Relate to others?

The immune system works closely with the circulatory system



# Endocrine System

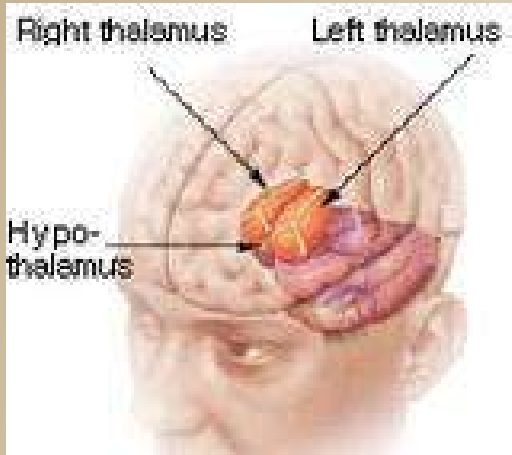
On-level Biology Book: Pages 929 – 939

Pre-AP Biology Book: Pages 996 - 1008

# Purpose

The Endocrine System  
controls growth,  
development, and  
metabolism; maintains  
homeostasis

# Organs/Components

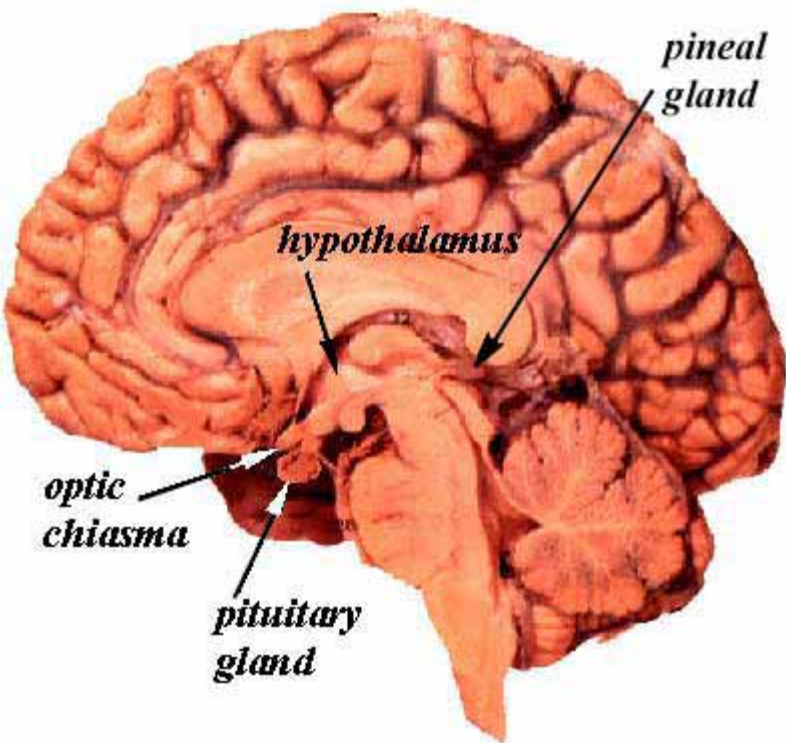


- Hypothalamus

- Part of the brain that the main link between the endocrine and nervous systems

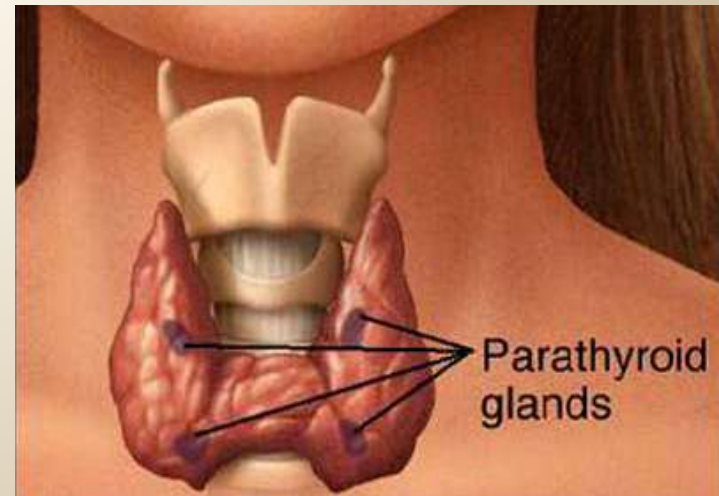
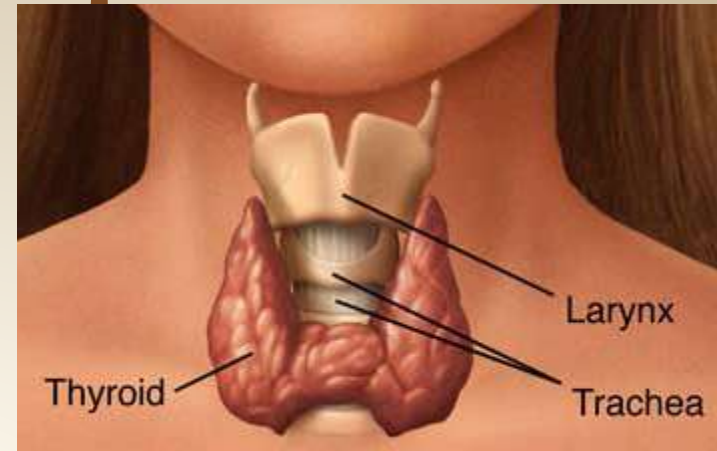
- Pituitary

- The main gland of the endocrine system. It is stimulated by the hypothalamus when changes in homeostasis are detected and produces chemicals and stimulates other glands.



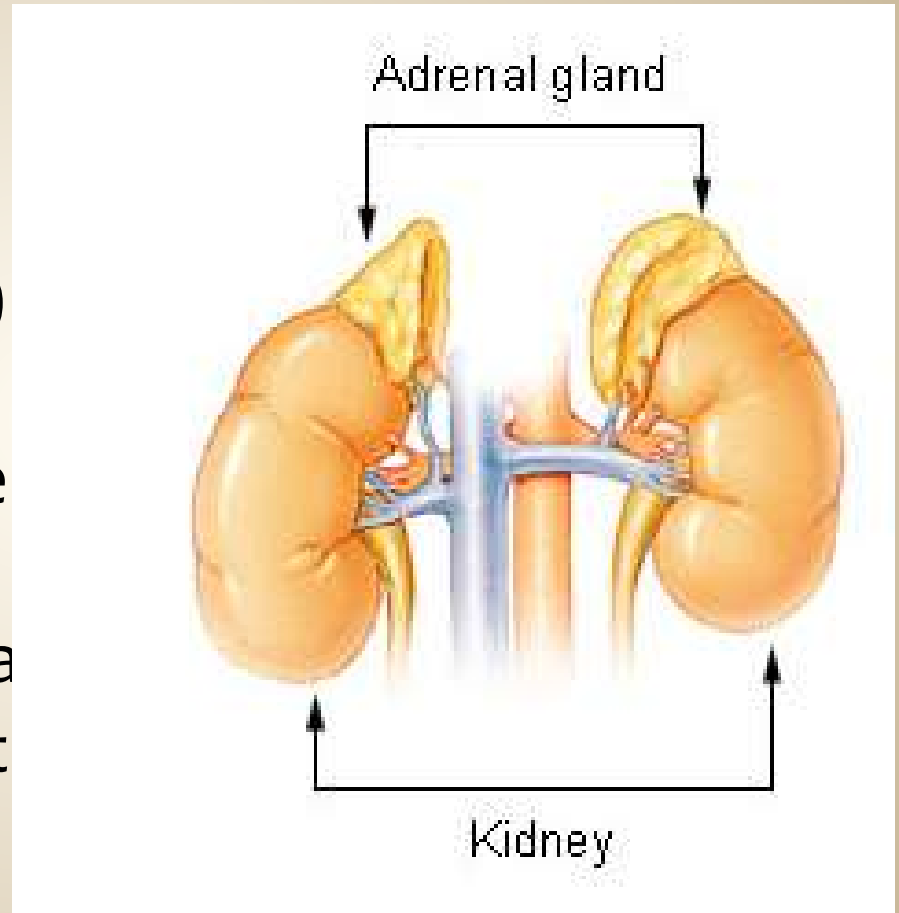
# Organs/Components

- **Thyroid**
  - Produces thyroxin, the main growth and metabolic hormone
  - Also regulates calcium levels in the blood
- **Parathyroid**
  - Regulates minerals by producing PTH (parathyroid hormone)



# Organs/Components

- Adrenal Glands
  - Prepare the body for stress by releasing hormones
  - epinephrine (adrenaline) norepinephrine which increases blood pressure and heart rate
  - called corticosteroids that influence or regulate salt and water balance in the body



# Organs/Components

## ● Pancreas

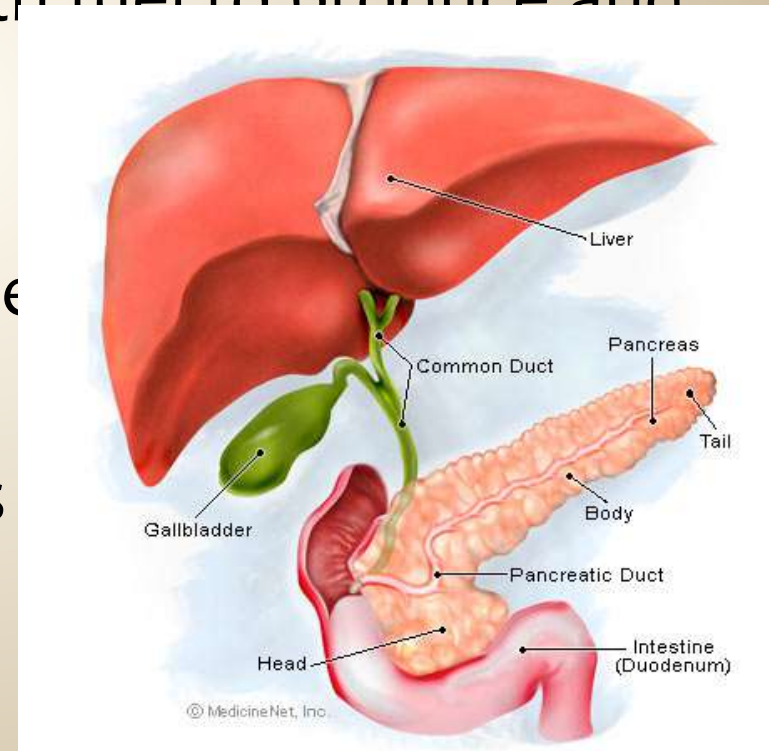
- produces two important hormones
  - insulin and glucagon: they work together to maintain a steady level of glucose, or sugar, in the blood and to keep the body supplied with fuel to produce and maintain stores of energy

## ● Ovaries

- Secretes female sex hormones

## ● Testes

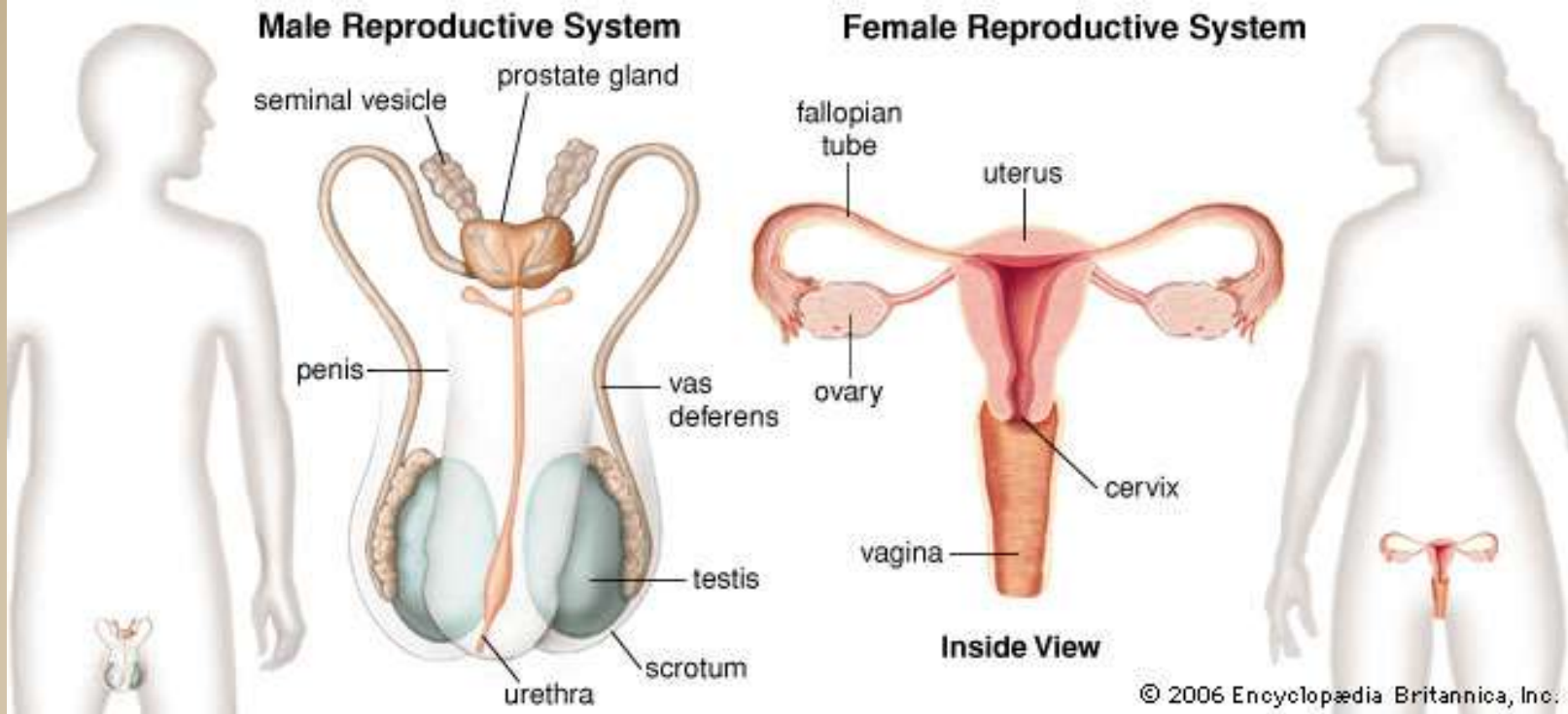
- Secretes male sex hormones



# How Does this System Relate to others?

The endocrine system works closely with the reproductive system and the digestive system. Several hormones originate in the brain, part of the nervous system.





# Reproductive System

On-Level Biology Book: Pages 995 – 1019

Pre-AP Biology Book: Pages 1009 - 1029

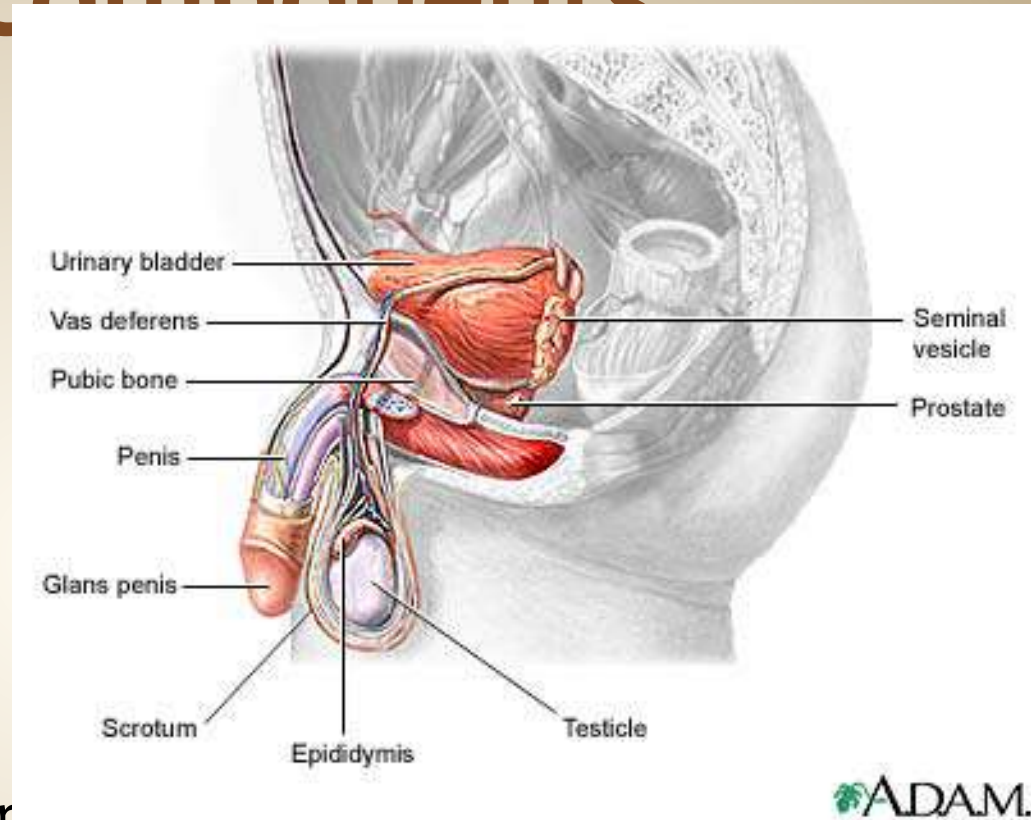
# Purpose

The Reproductive System  
produces reproductive  
cells; in females nurtures  
and protects developing  
embryo

# Organs/Components

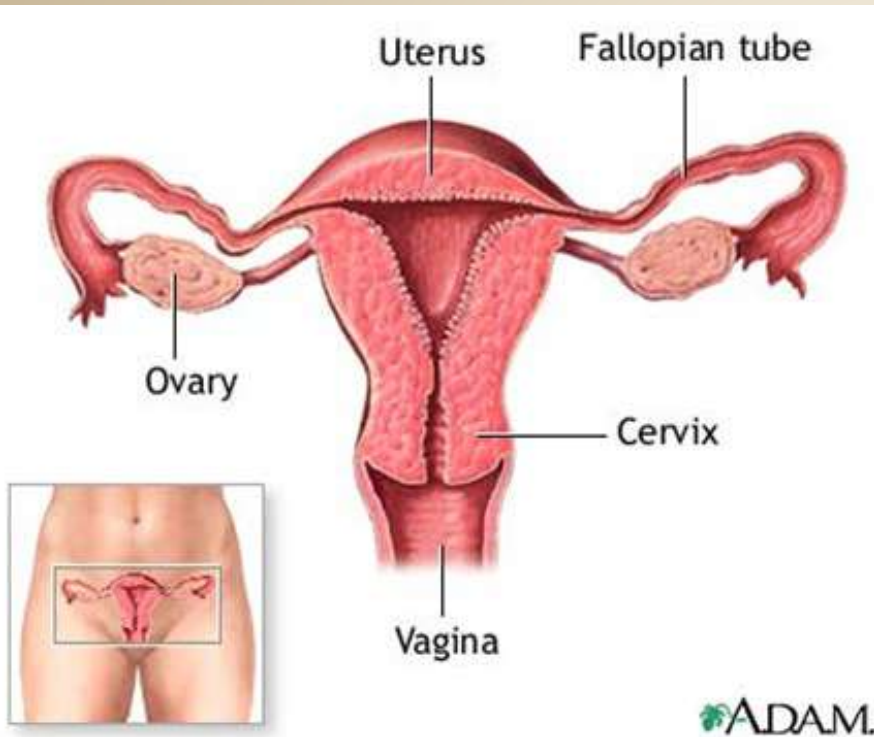
## Males

- Penis
- Testes
  - Site of sperm production
- Epididymis
  - Where sperm mature
- Vas Deferens
  - Duct where mature sperm are stored before being transported to the urethra
- Urethra
  - Transports sperm out of the male body



# Organs/Components

## Females



- Ovaries
  - Where eggs mature
- Fallopian Tubes
  - Tube connecting ovaries to the uterus
- Uterus
  - Where a fetus develops during pregnancy
- Vagina
  - Canal leading to the uterus

# How Does this System Relate to others?

The reproductive system works most closely with the endocrine system (hormones)