



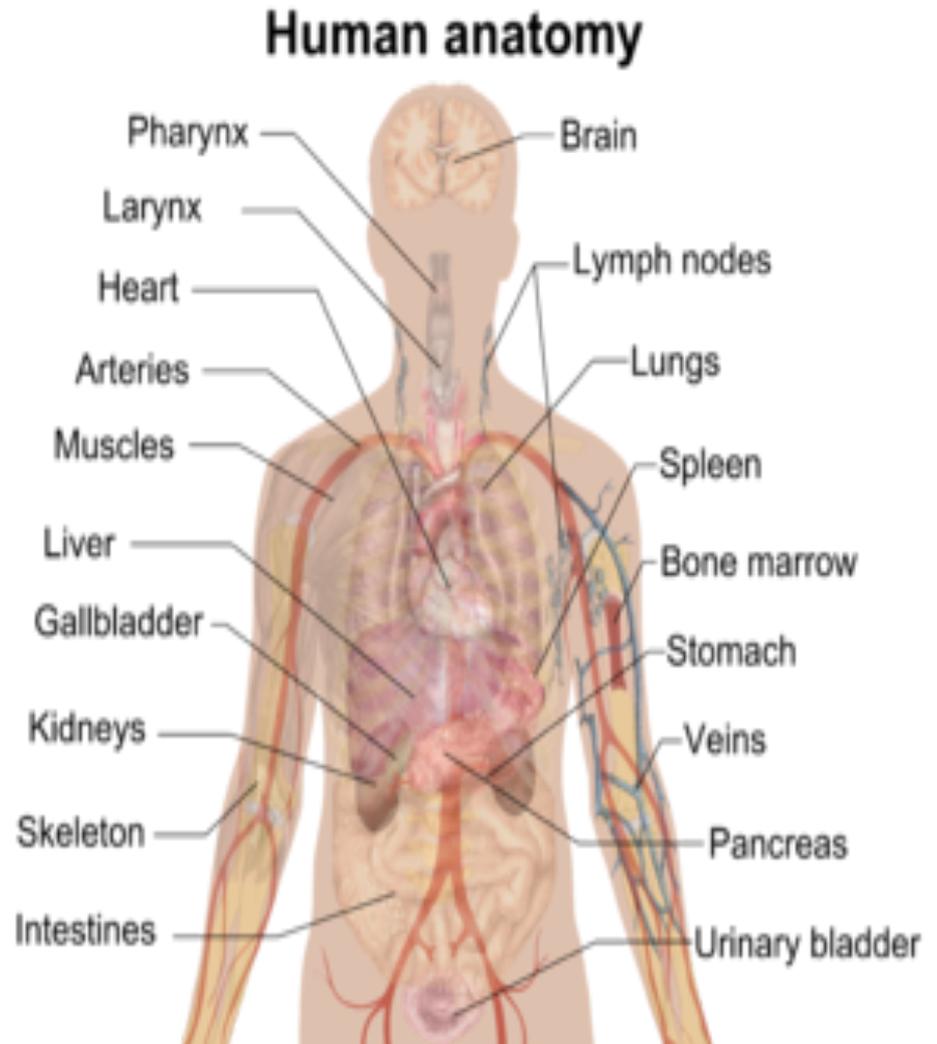
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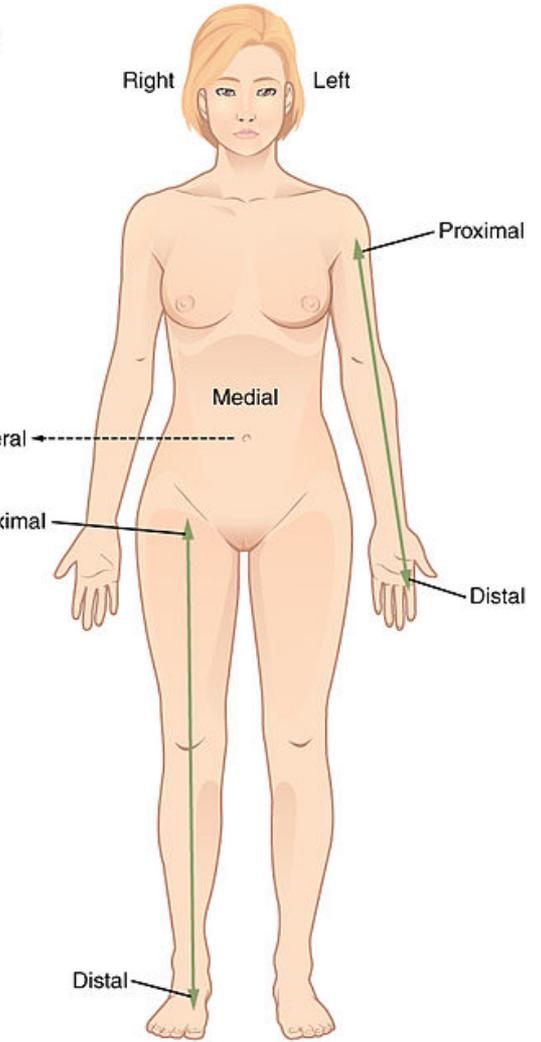
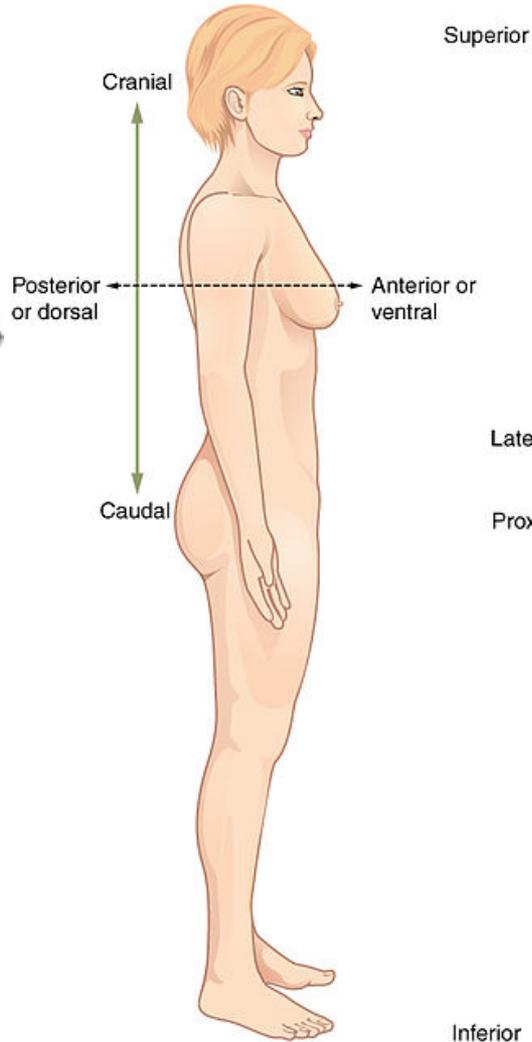
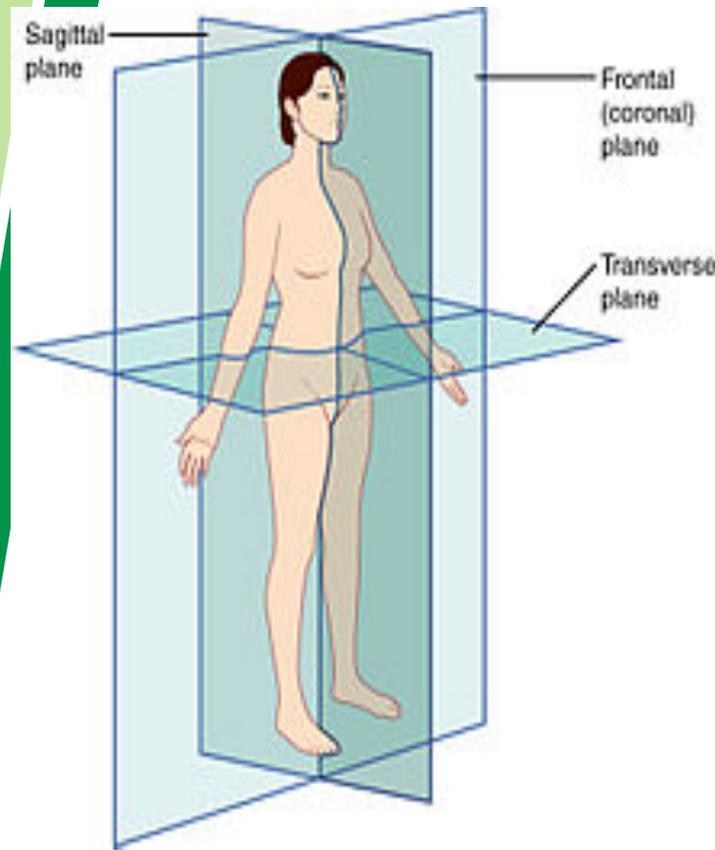
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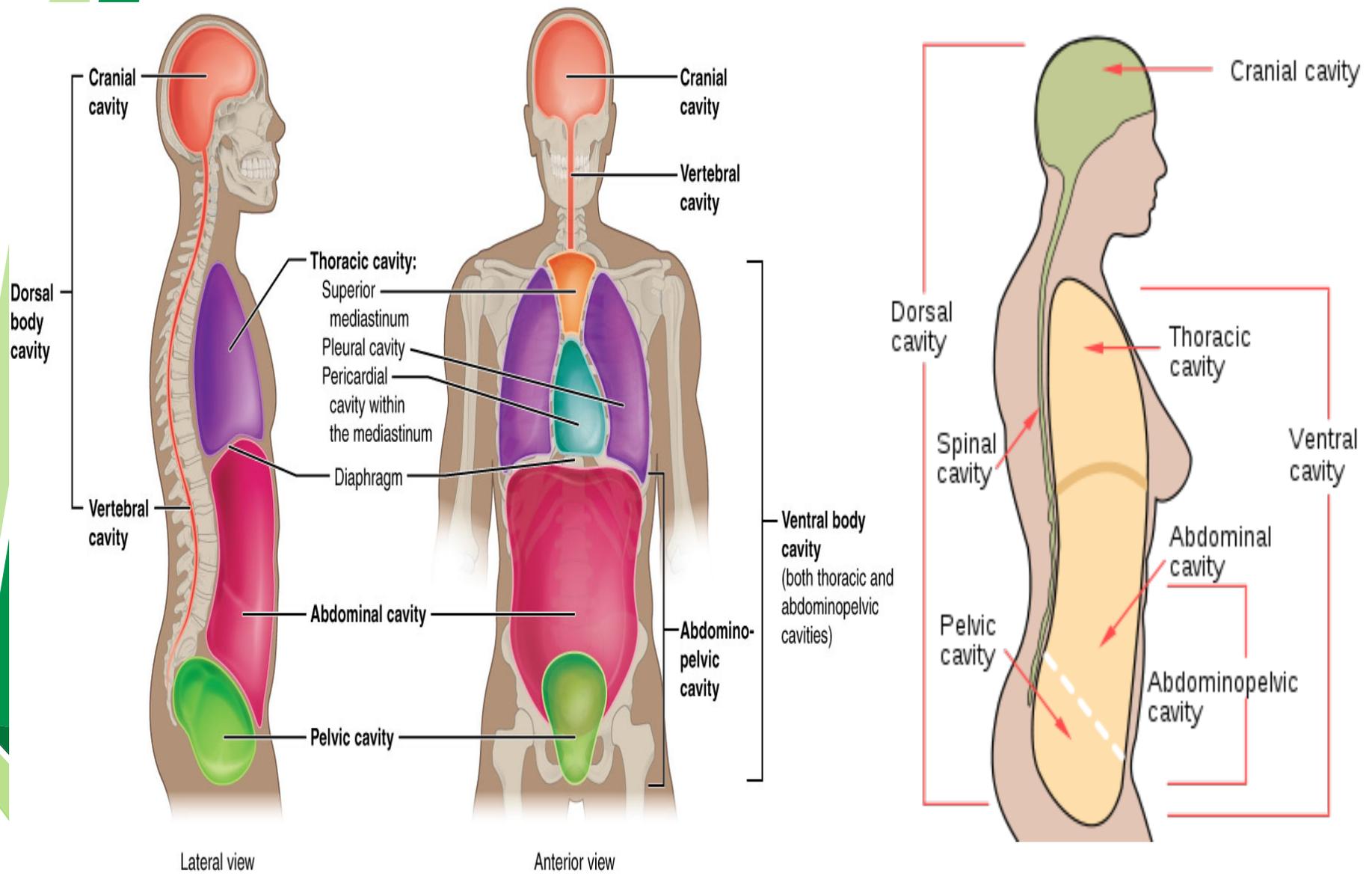
Human Organs & Organ Systems



Anatomical Direction Terms and Body Planes



Human Body Cavities



Lateral view

Anterior view

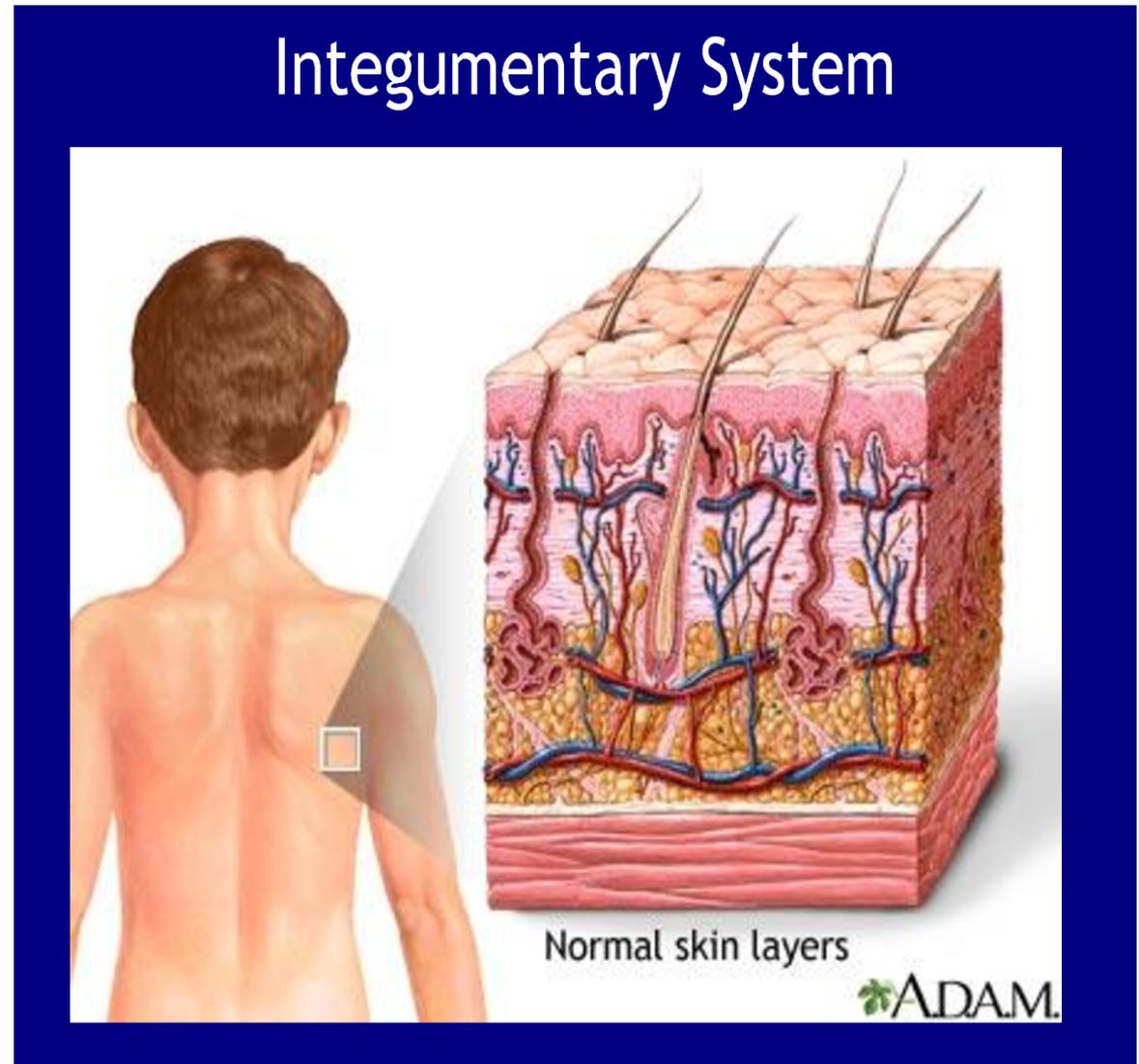
Integumentary System: Skin and its associated components

Helps protect body from damage.

Includes mucous membranes and skin (including things that arise from skin: hair, scales, feathers, hooves, and nails).

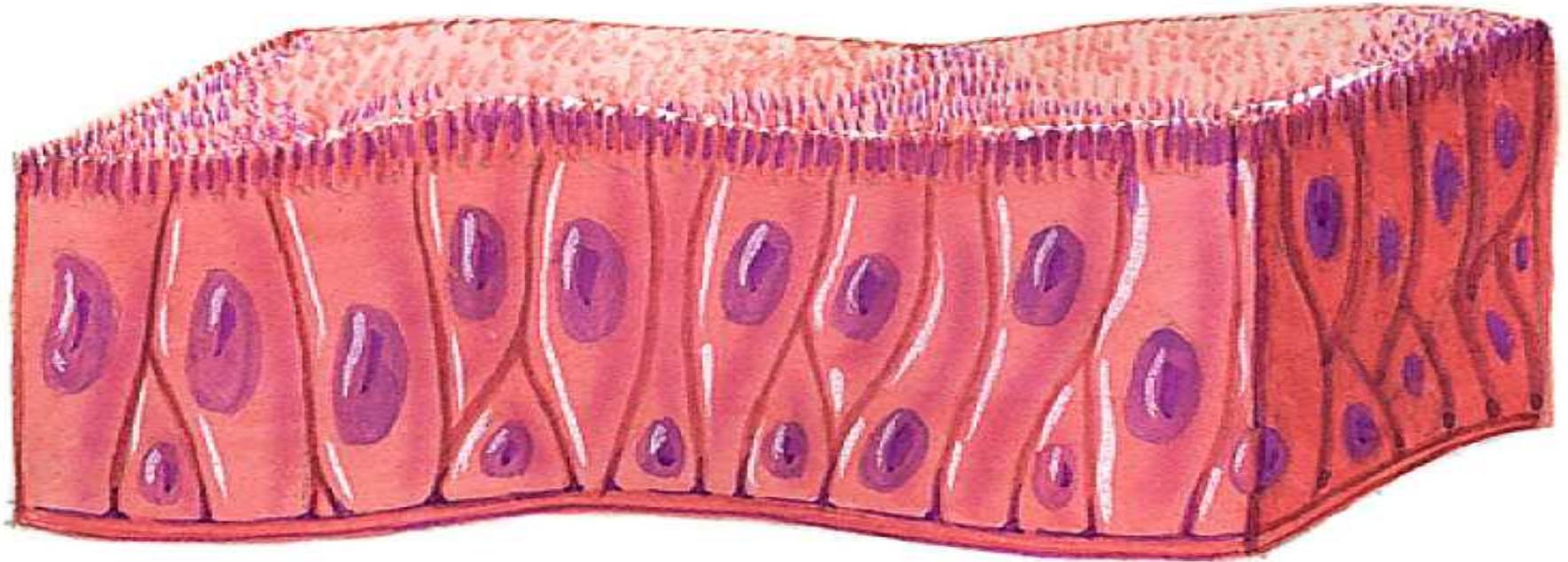
Variety of functions, including:

- waterproofing
- cushioning
- barrier to infectious disease
- protects deeper tissues
- excretes wastes
- regulates temperature
- attachment site for sensory receptors to detect pain, sensation, pressure and temperature



Epithelial Tissue Characteristics

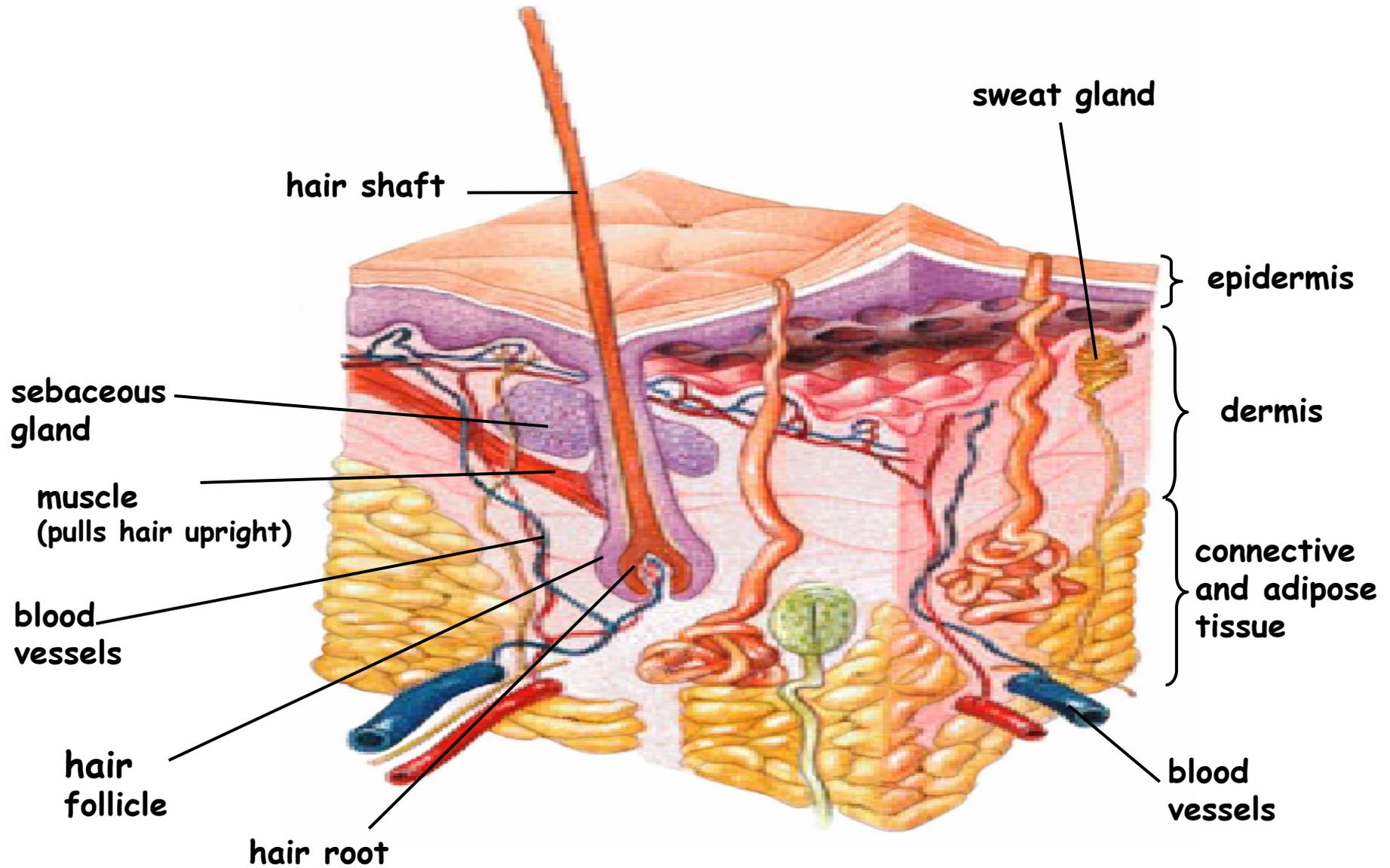
Free surface, Basement membrane, Tightly packed cells



Function: Often form barriers.

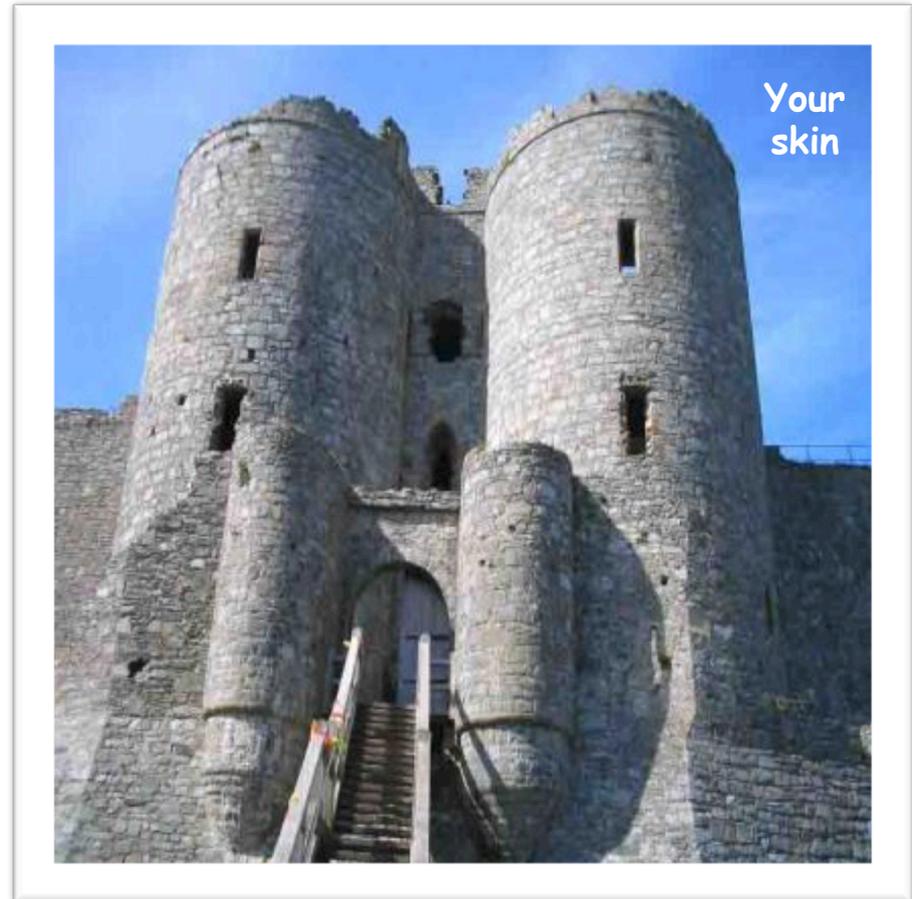
Example: Elongated epithelial cells bearing cilia line the passage to the lungs and tubes of the reproductive organs.

Integumentary System: Skin and its associated components



First Line of Immune Defense

- Structures, chemicals, processes that work to *prevent pathogens entering the body.*
- Includes the skin and mucous membranes of the respiratory, digestive, urinary, and reproductive systems.



First Line of Defense

Skin – Physical Components of Defense

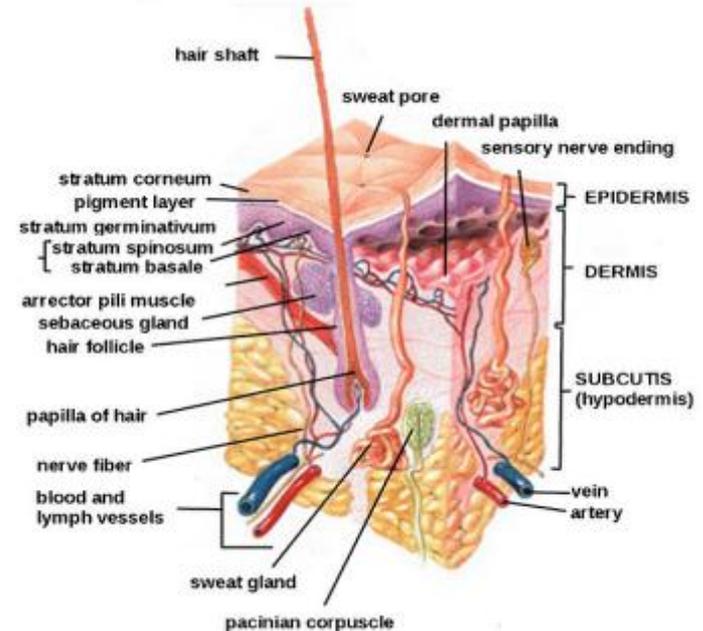
Two major layers:

1. epidermis

- Outer layer composed of multiple layers of tightly packed cells
 - Few pathogens can penetrate these layers
 - Shedding of dead skin cells removes attached microorganisms
- Epidermal dendritic cells phagocytize pathogens.
 - These cells extend out among other cells of the epidermis, forming a network to intercept invaders.

2. dermis

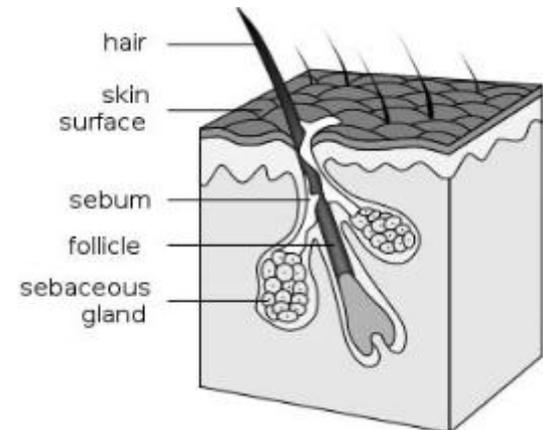
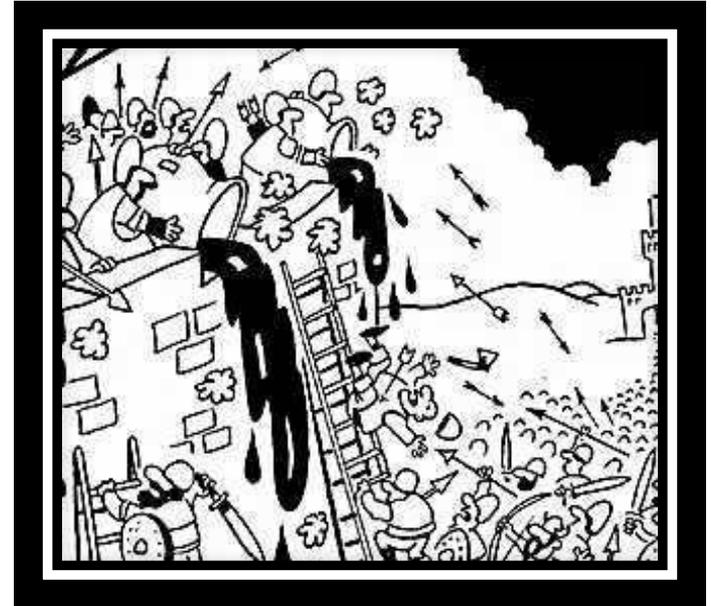
- Contains [protein](#) fibers called collagen
 - Give skin strength and pliability to resist abrasions that could introduce microorganisms



First Line of Defense

Skin - Chemical Components of Defense

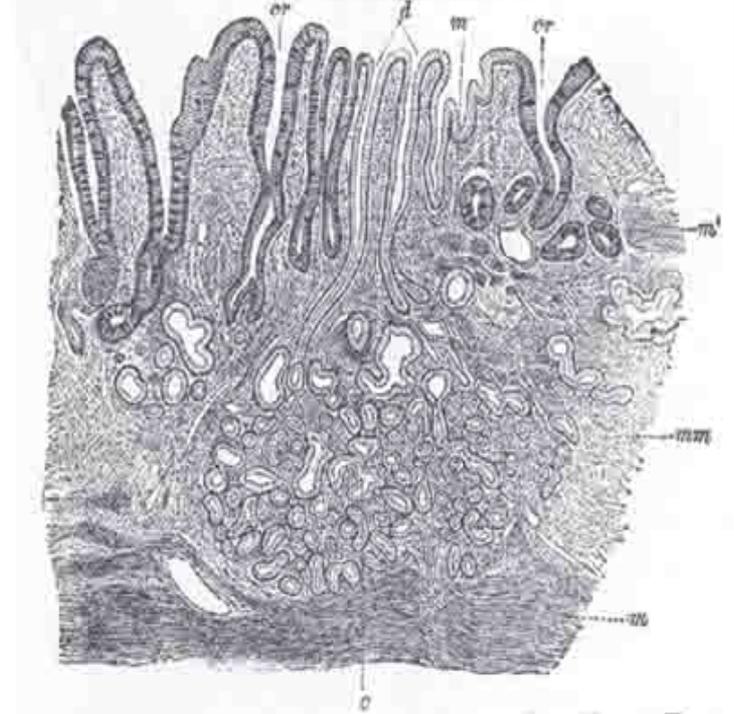
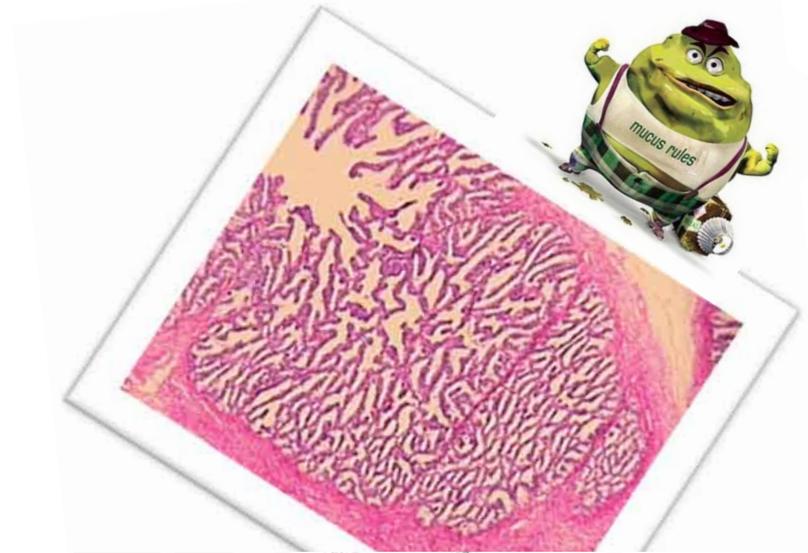
- **perspiration** secreted by sweat glands
 - Salt- inhibits growth of pathogen by drawing water from their cells
 - Antimicrobial **peptides**
 - Lysozyme- destroys cell wall of bacteria
- **sebum** secreted by sebaceous (oil) glands
 - Helps keep skin pliable and less likely to break or tear
 - Lowers **pH** of skin to a level inhibitory to many bacteria



First Line of Defense

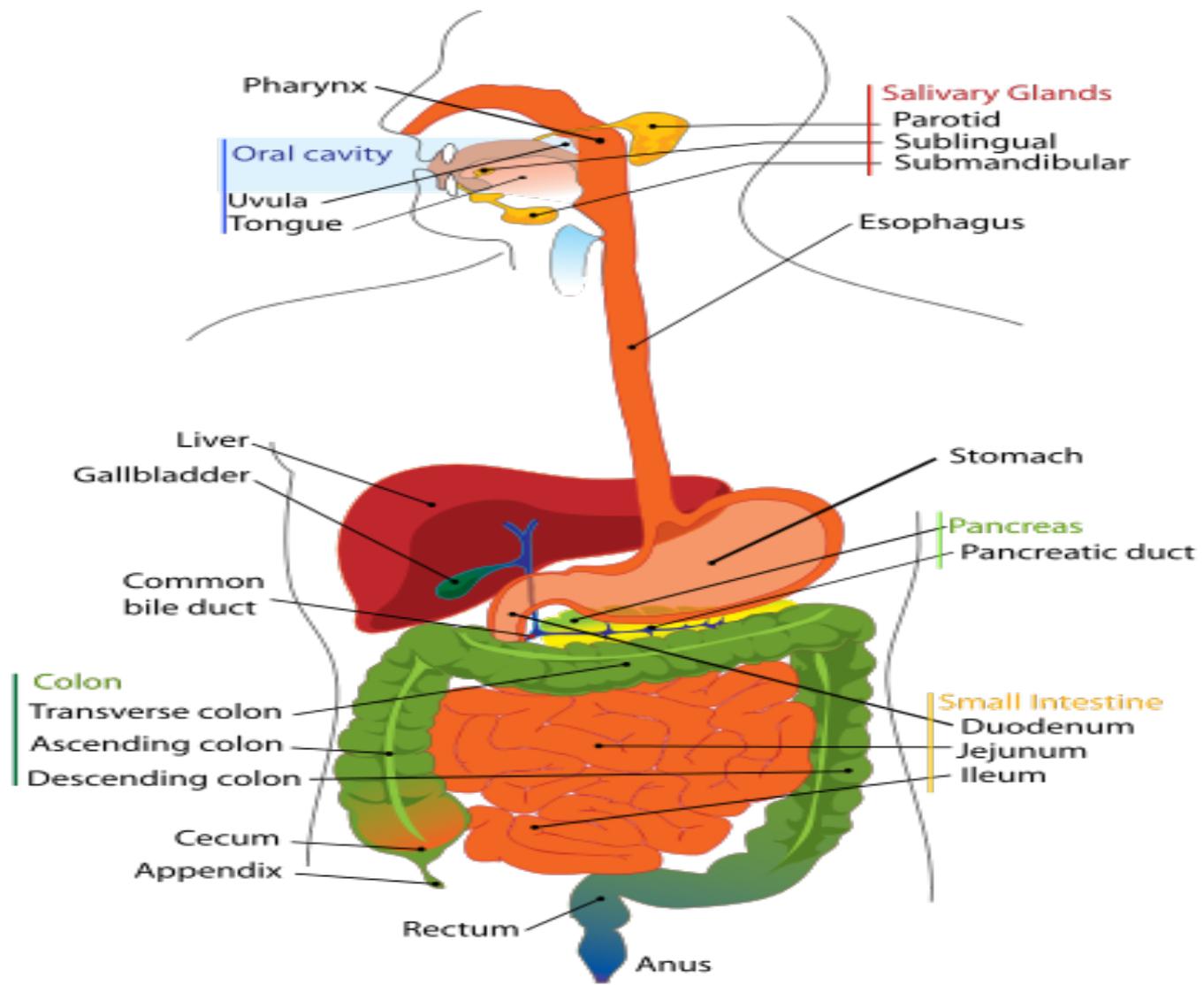
Mucous Membrane

- Line all body cavities open to the outside environment.
- Unlike surface epidermal cells, epithelial cells are living.
- Epithelial cells packed tightly to prevent entry of pathogens, but often only one cell layer thick, so pathogens sometimes breach the barrier.
- Continual shedding of cells carries attached microorganisms away
- Besides producing mucus, mucous membranes also produce lysozyme and other antimicrobial **peptides**.
- OMG U R Nasty > Every day you swallow and digest about 1 liter of mucus.



First Line of Defense

Digestive System (a.k.a. gastrointestinal tract & GI tract)



WATCH THIS!

Digestive Enzymes

Food Moving Through Digestive System

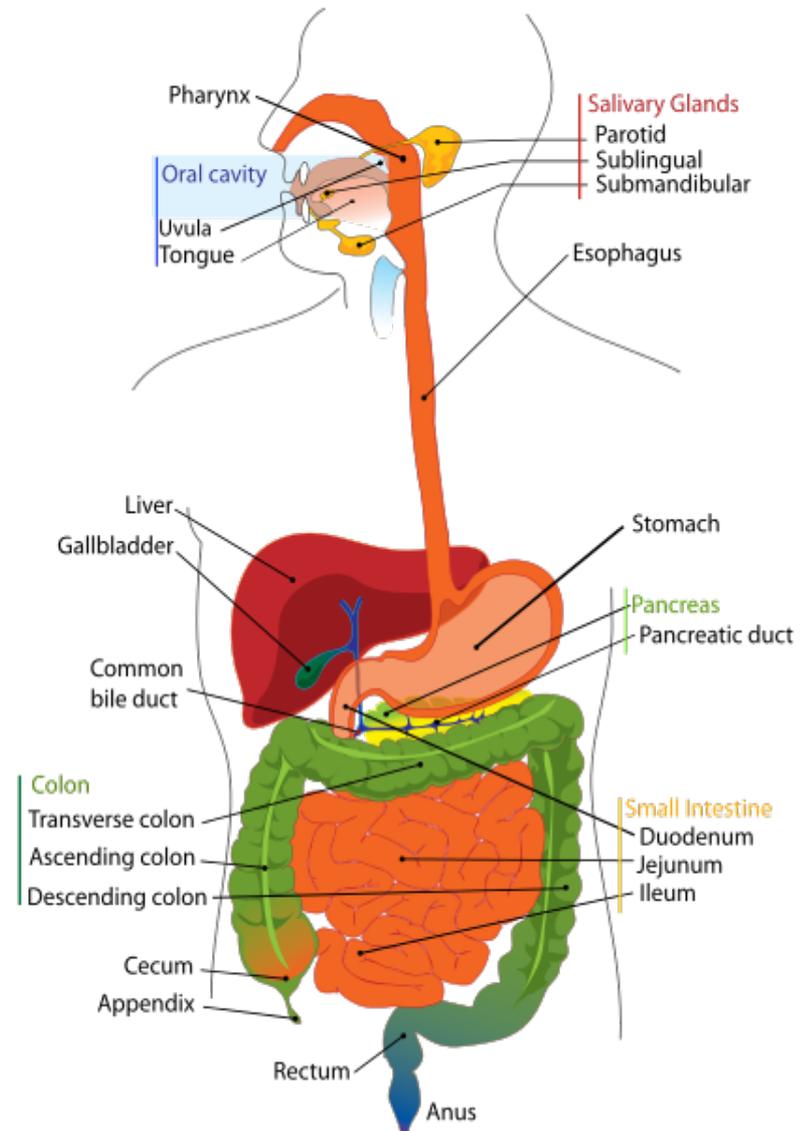
Digestive System:
Part 1 & Part 2
from Crash Course Biology

Digestive System (a.k.a. gastrointestinal tract & GI tract)

Digestion involves the breakdown of food into smaller components that can be absorbed by the body.

Process of digestion has many stages::

- **Oral cavity:** Secretion of saliva (which contains digestive enzyme amylase) helps produce a soft, moist bolus of food that can pass down the esophagus.
- **Esophagus:** Passageway from oral cavity to stomach.
- **Stomach:** Gastric juice and enzymes help break down food.
- **Small Intestine:** Most digestion takes place in the small intestine where nutrients are absorbed.
 - **Gallbladder:** Where bile (a fluid produced by the liver) is stored before release into small intestine to emulsify fats.
 - **Pancreas:** Both an endocrine (hormone secreting) and a digestive organ. Secretes pancreatic juice with enzymes that help with digestion and absorption of nutrients in small intestine.
- **Large Intestine/Colon:** Water and some minerals are reabsorbed back into the blood. Colon is where most of the bacteria in the GI tract live.
- **Rectum & Anus:** Waste products of digestion are defecated.



Digestive System

Tiny, fingerlike projections called *villi* are found in the intestines to increase the surface area for absorption.

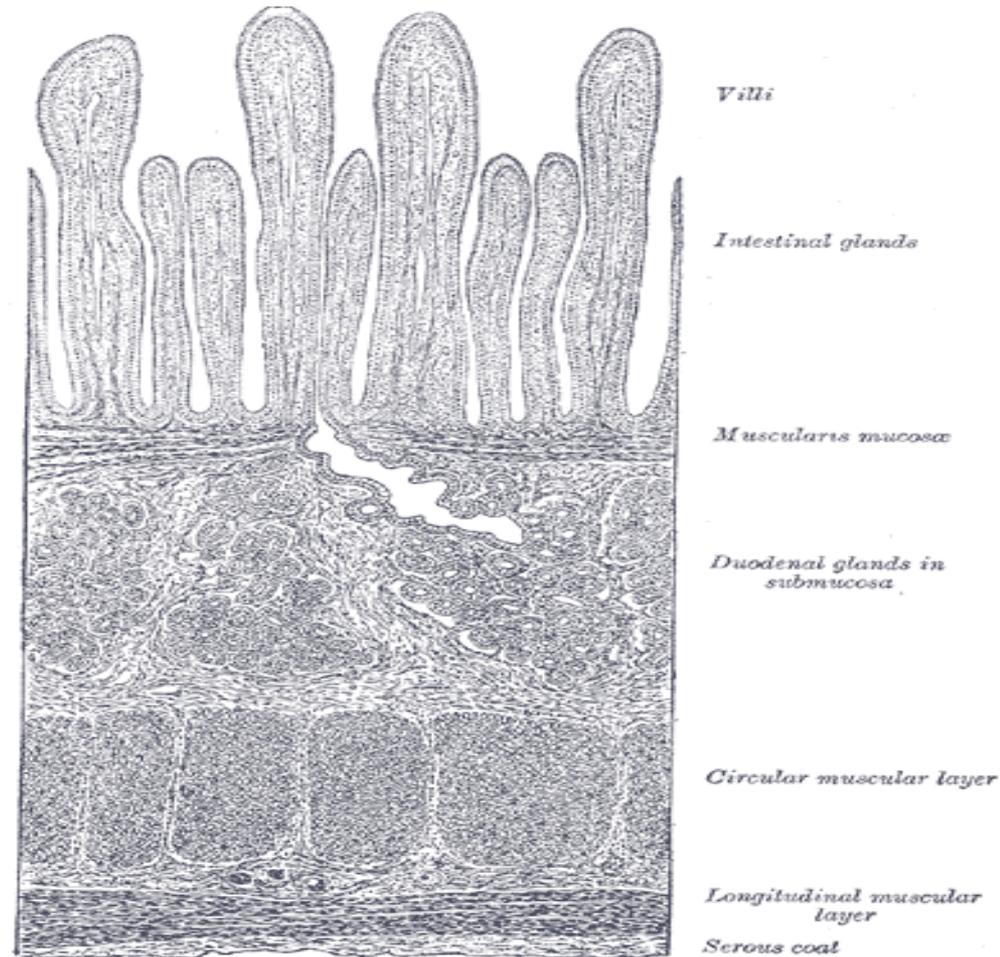
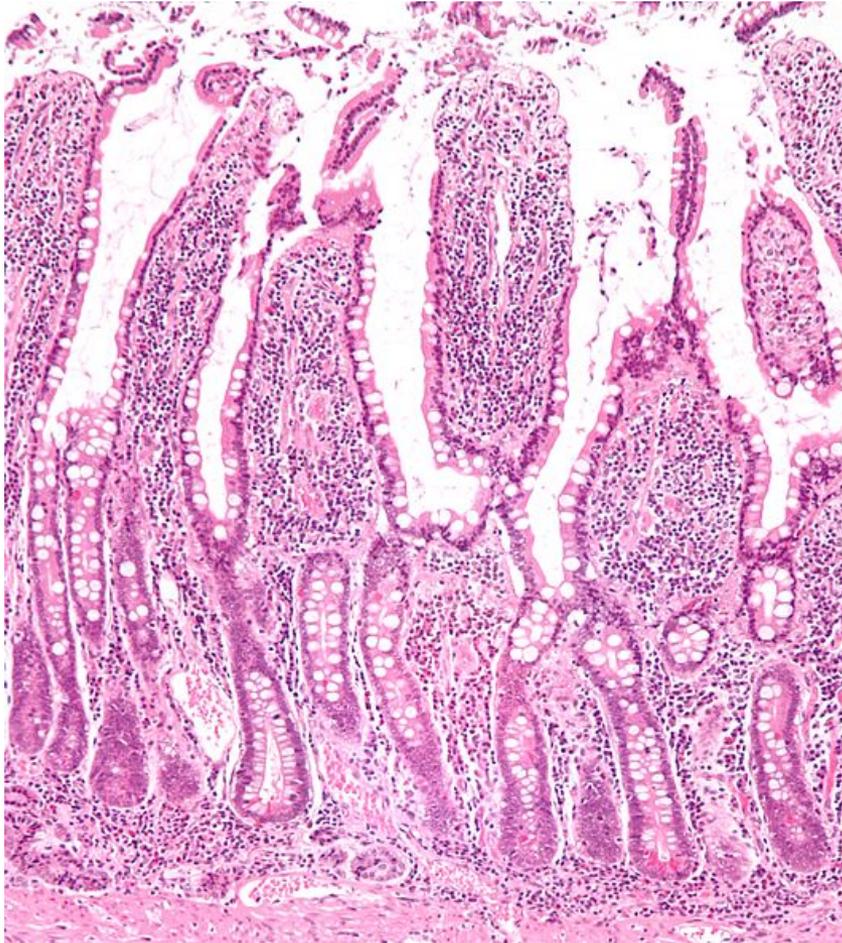
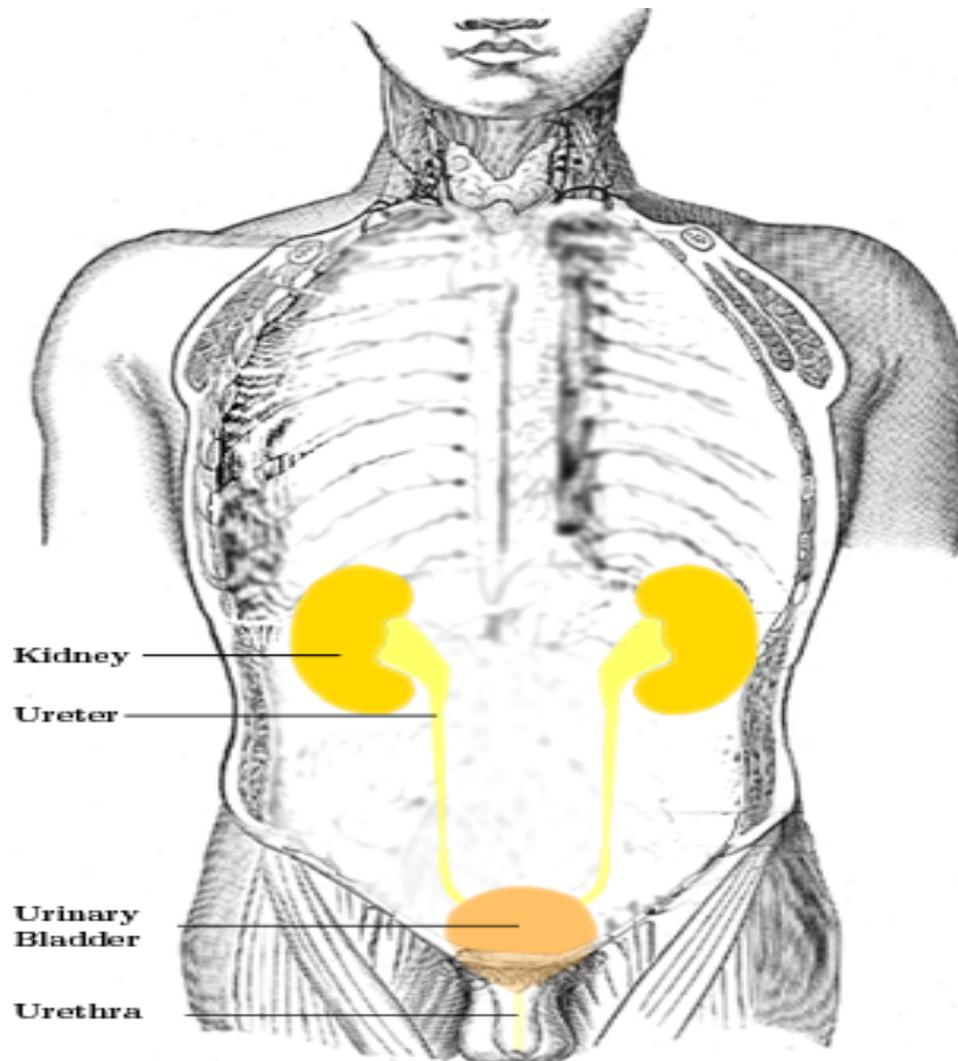


Image: [Low magnification micrograph of small intestinal mucosa showing villi](#), Wiki: [Illustration of section of the duodenum](#), Gray's Anatomy, Wiki

Urinary System (a.k.a. Renal System)



Group of organs that functions to remove liquid waste from the blood in the form of urine.

Maintains a stable balance of salts and other substances in the blood .

Substances are filtered out from the body in the form of urine, a liquid produced by the kidneys, collected in the bladder and excreted through the urethra.

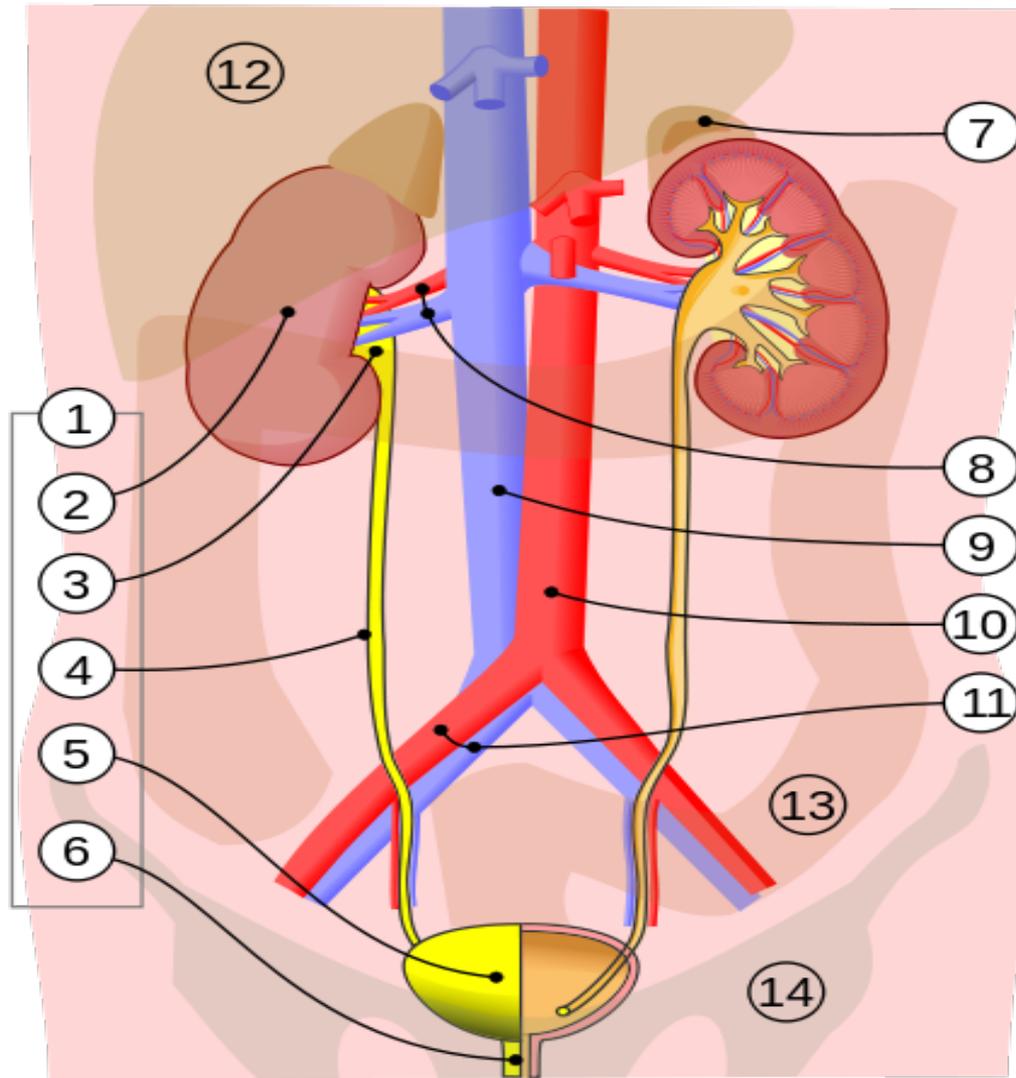
Video links:

[The Urinary System](#)

(short video)

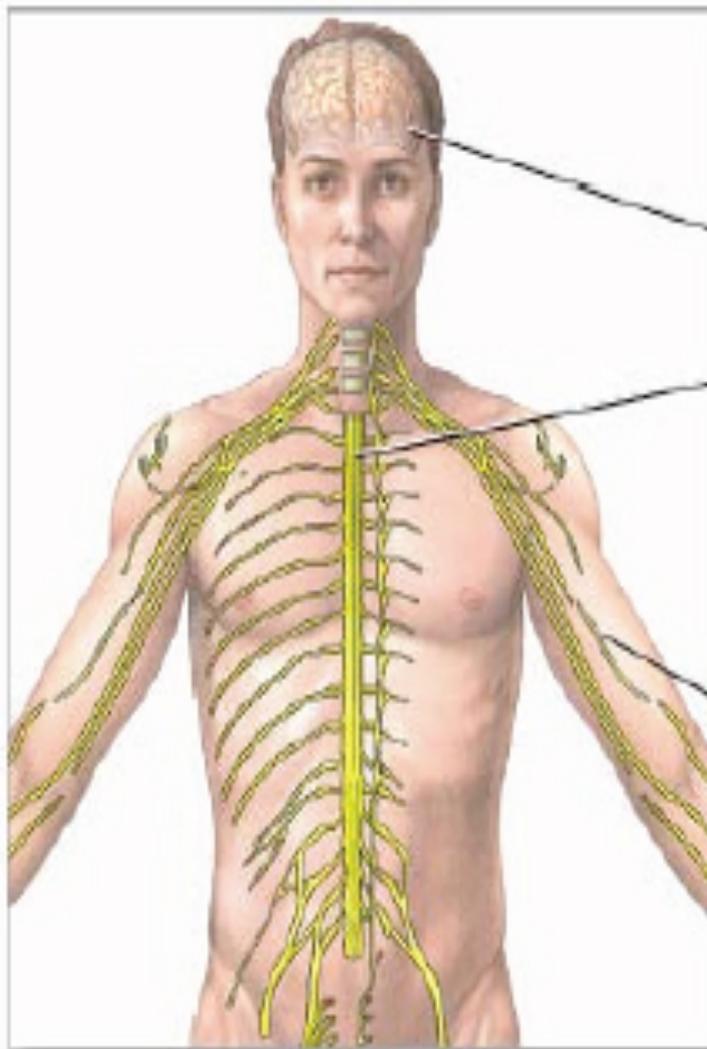
[The Excretory System: From Your Heart to the Toilet](#) from Crash Course Biology

Urinary System (a.k.a. Renal System)



1. Urinary system
 2. Kidney
 3. Renal pelvis
 4. Ureter
 5. Urinary bladder
 6. Urethra
 7. Adrenal gland
 8. Renal artery and vein
 9. Inferior vena cava
 10. Abdominal aorta
 11. Common iliac artery and vein
- Shaded:*
12. Liver
 13. Large intestine
 14. Pelvis

Nervous System



Central nervous system

Brain

Spinal cord

Peripheral nervous system

Peripheral nerve

Consists of the brain, spinal cord, sensory organs, and all of the nerves that connect these organs with the rest of the body.

Together, these organs are responsible for the control of the body and communication among its parts.

Video links:

[Nervous System](#)

(short video)

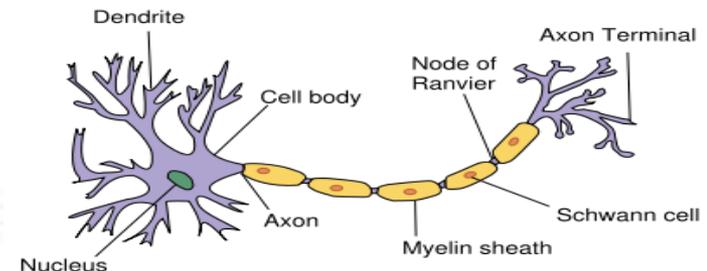
[Telegraph Line](#)

School House Rock

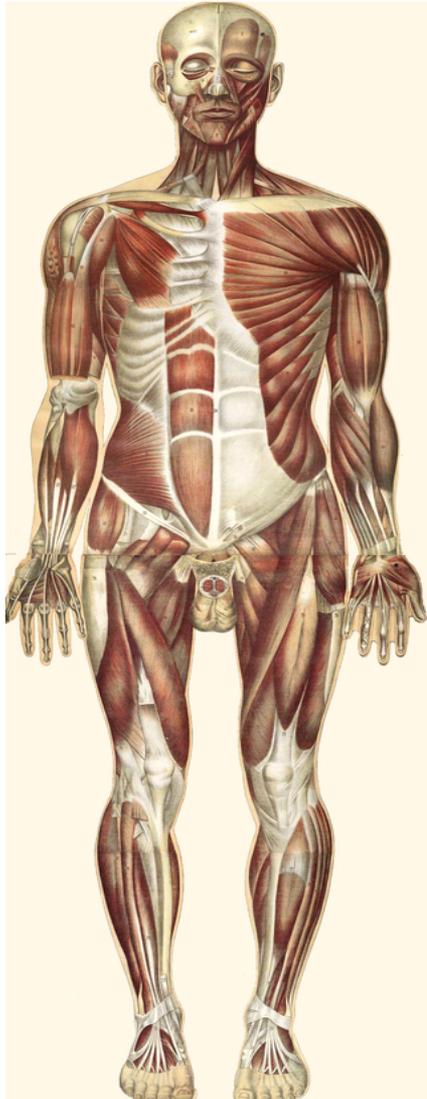
[Nervous System](#)

from Crash Course Biology

ADAM.



Muscular System



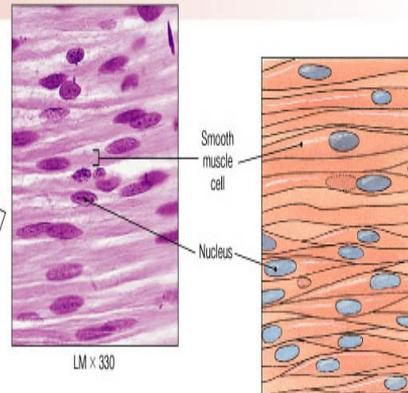
Responsible for movement of the human body. Skeletal muscles make up roughly half of a person's body weight.

Muscle tissue is also found inside of the heart, digestive organs, and blood vessels. Where muscles serve to move substances throughout the body.

Smooth Muscle Tissue

LOCATIONS: Encircles blood vessels; in the walls of digestive, respiratory, urinary, and reproductive organs

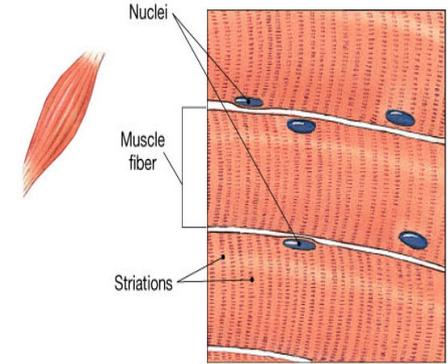
FUNCTIONS: Moves food, urine, and reproductive tract secretions; controls diameter of respiratory passageways; regulates diameter of blood vessels and contributes to regulation of tissue blood flow



Skeletal Muscle Tissue

LOCATIONS: Combined with connective tissues and nervous tissue in skeletal muscles

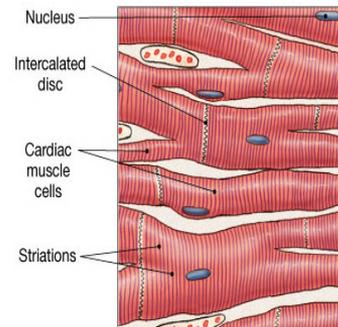
FUNCTIONS: Moves or stabilizes the position of the skeleton; guards entrances and exits to the digestive, respiratory, and urinary tracts; generates heat; protects internal organs



Cardiac Muscle Tissue

LOCATION: Heart

FUNCTIONS: Circulates blood; maintains blood (hydrostatic) pressure



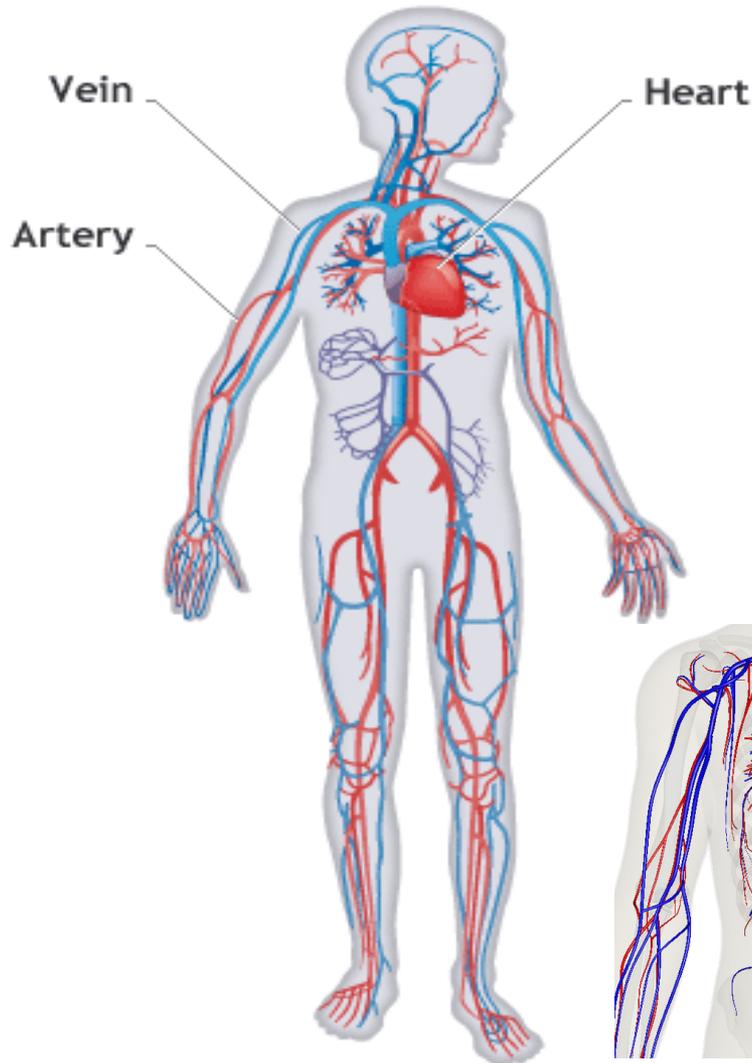
Video:

Big Guns:

[The Muscular System](#)

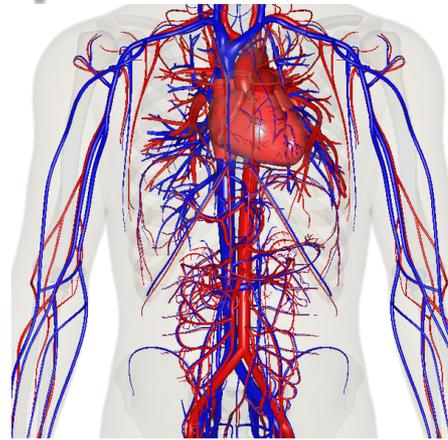
from Crash Course Biology

Circulatory System



Network of organs and vessels responsible for the flow of blood, nutrients, oxygen and other gases, and hormones to and from cells.

Without the circulatory system, the body would not be able to fight disease or maintain a stable internal environment — such as proper temperature and pH — known as homeostasis.



Video links:

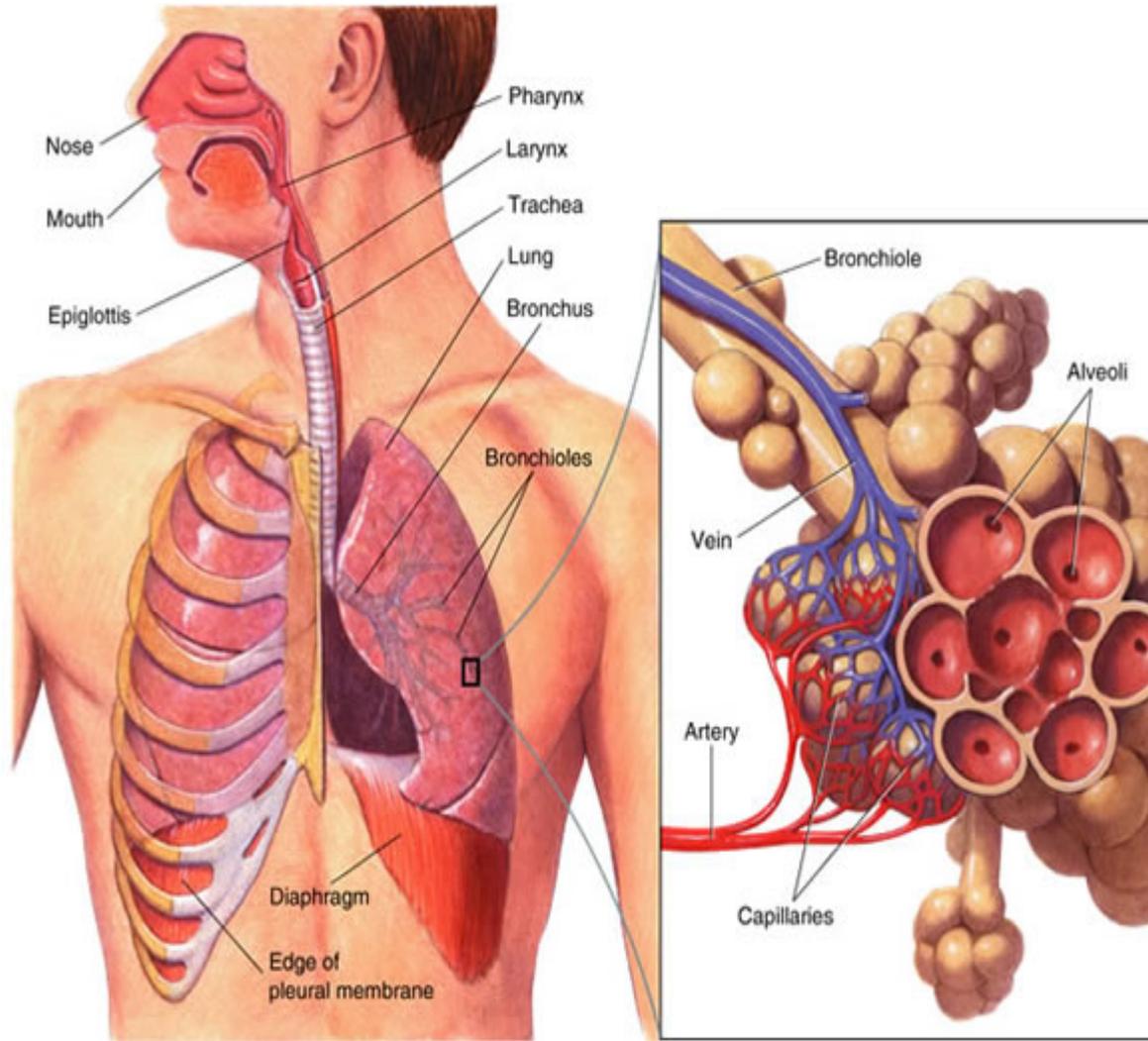
[Circulatory System Rap](#)

(Pump it Up!)

[Circulatory System & Respiratory System](#)

from Crash Course Biology

Respiratory System



The main function of the respiratory system is to supply the blood with oxygen (O_2) in order for the blood to deliver oxygen to all parts of the body.

When we breathe, we inhale oxygen and exhale the waste product carbon dioxide (CO_2).

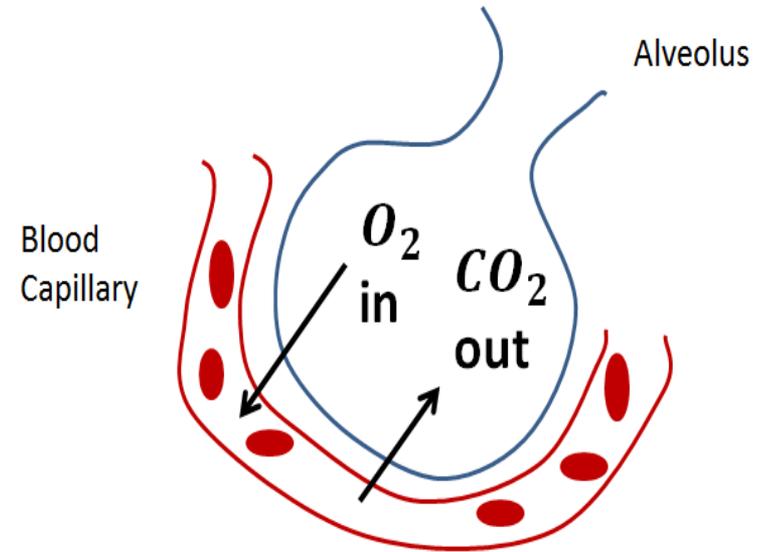
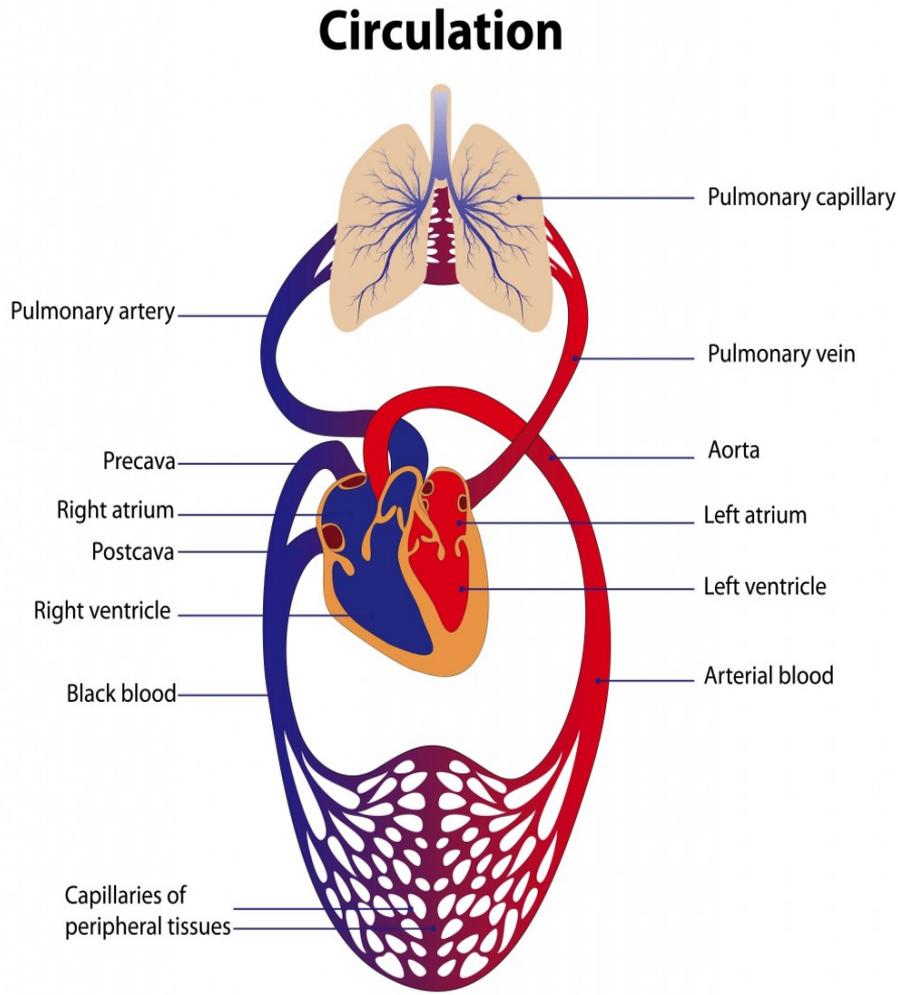
Video links:

[Respiration](#)

[ATP & Respiration](#)

from Crash Course Biology

Gas Exchange



Video links:

[Circulatory System Rap](#)

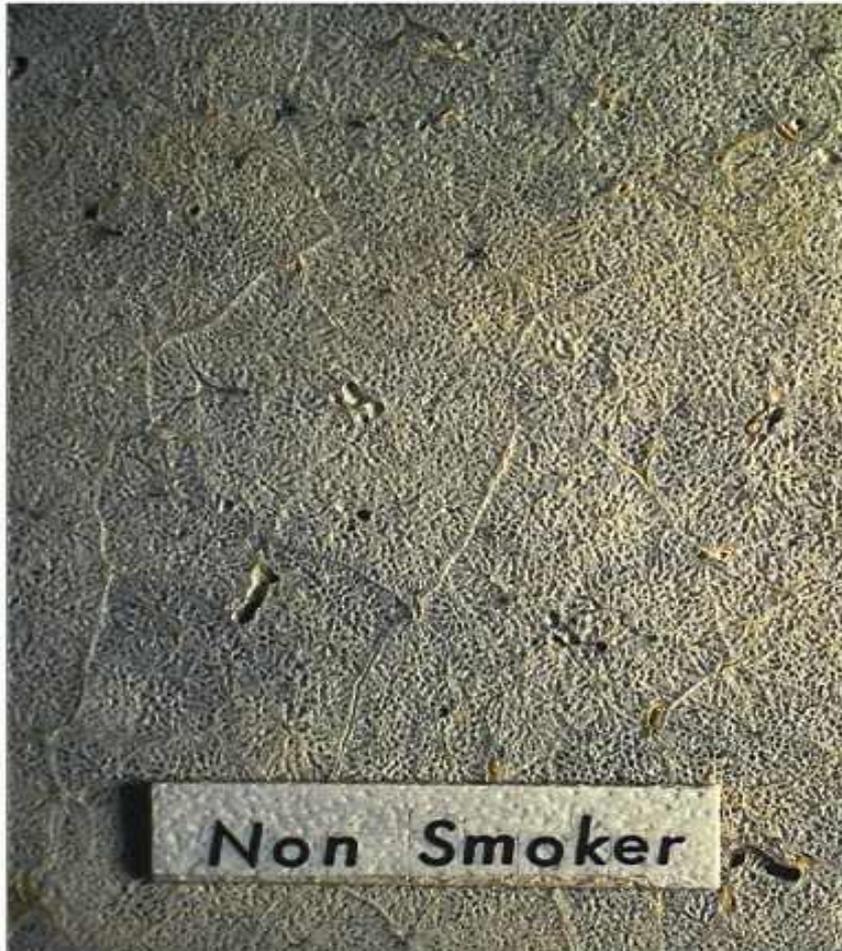
(Pump it Up!)

[Circulatory System & Respiratory System](#)

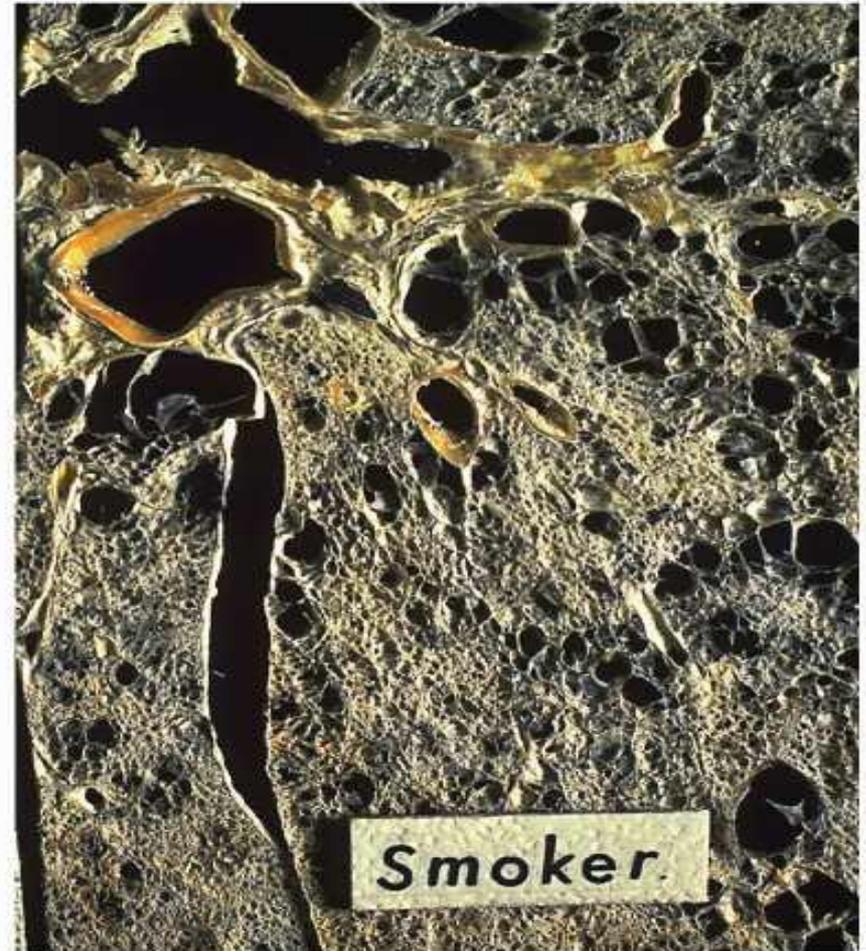
from Crash Course Biology

Effect of Smoking on Lungs

Normal lung tissue from a nonsmoker has nearly invisible small openings, the alveoli, surrounded by healthy tissue.



The lung of a smoker suffering from emphysema is full of large holes, each caused by the rupture of hundreds of alveoli.



Effect of Smoking on Lungs



A tumor of lung cancer is visible as a large, pale mass; the lung tissue.

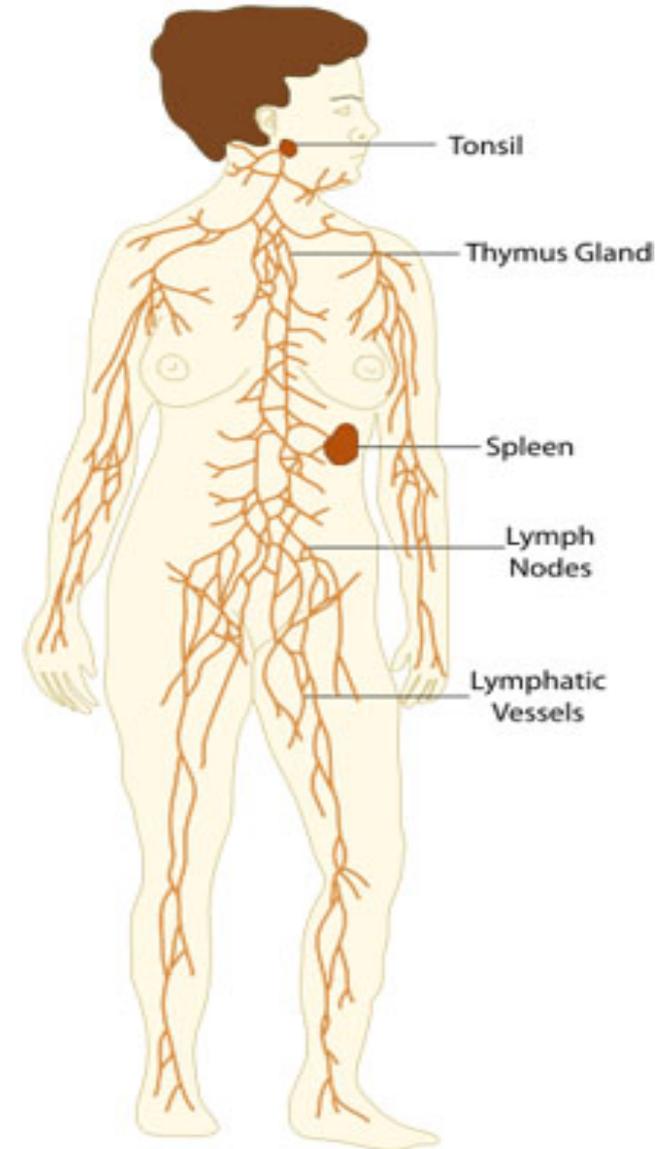
Surrounding it is black from trapped smoke particles.

Lymphatic System

- Screens tissues of the body for foreign antigens.
- Composed of lymphatic vessels and lymphatic cells.
- One-way system that conducts lymph from local tissues and returns it to the circulatory system.
 - Lymph is a liquid with similar composition to blood plasma.
 - Comes from fluid leaked from blood vessels into surrounding tissues.
- Lymph nodes house white blood cells called **lymphocytes** that recognize and attack foreign antigens present in lymph.

Video link:

[Lymphatic System](#)



Endocrine System

Collection of glands that secrete hormones into the circulatory system to be carried to a target organ.

Major endocrine glands include: pineal gland, pituitary gland, pancreas, ovaries, testes, thyroid gland, parathyroid gland, hypothalamus, and adrenal glands.

It's an information signal system like the nervous system, but unlike the nervous system, the endocrine system's effects are slow to initiate, and prolonged in their response, lasting from a few hours up to weeks.

Video links:

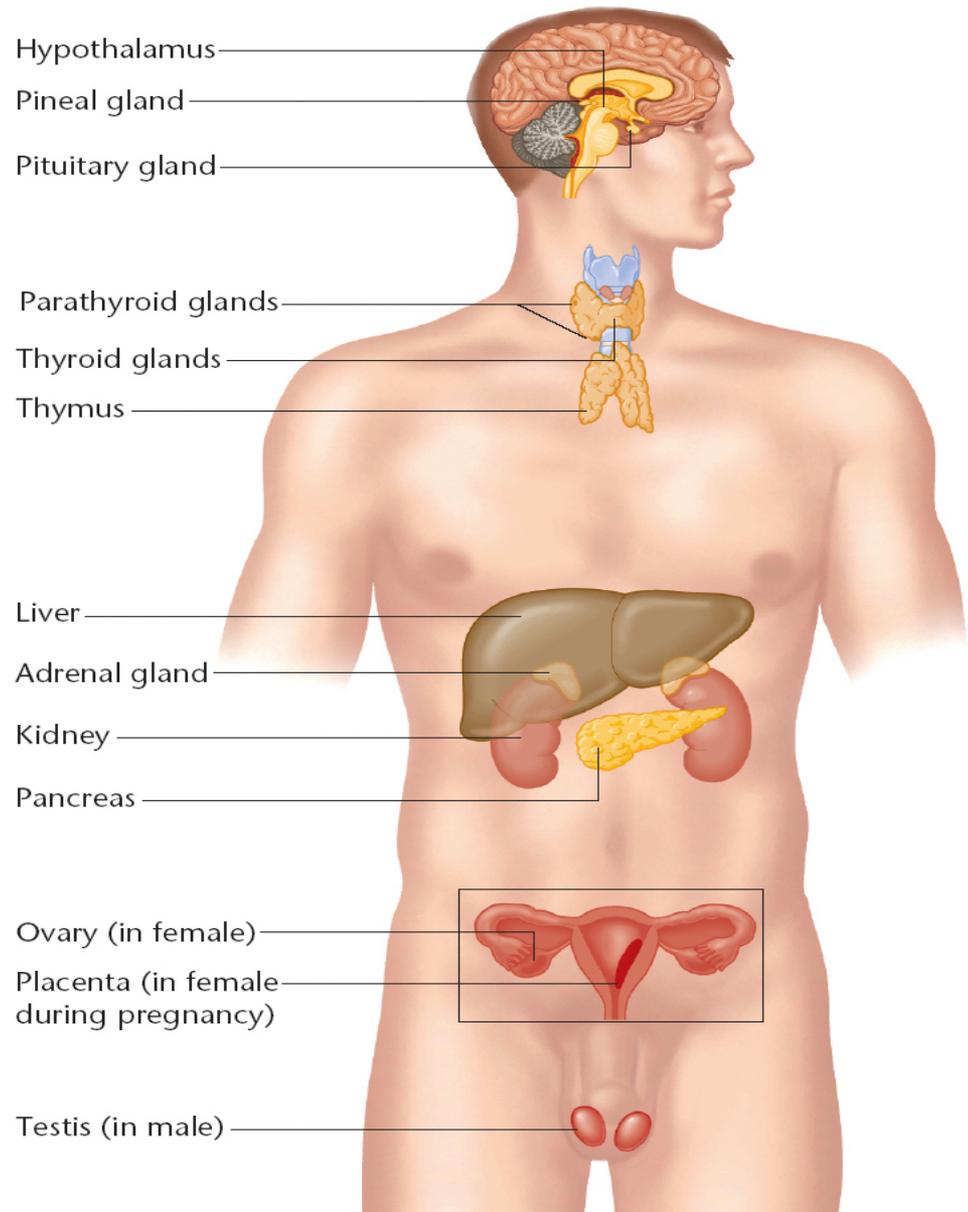
[Pancreas](#), a song by Heywood Banks

[Endocrine System](#)

[The Endocrine System: How It Works](#)

Great Glands: [Your Endocrine System](#)

from Crash Course Biology



Skeletal System

The human skeleton is the internal framework of the body.

Composed of 270 bones at birth that decreases to 206 bones by adulthood after some bones have fused together.

The human skeleton serves six major functions: support, movement, protection, production of blood cells, storage of ions and endocrine regulation.

Bone marrow gives rise to blood cells.

Video links:

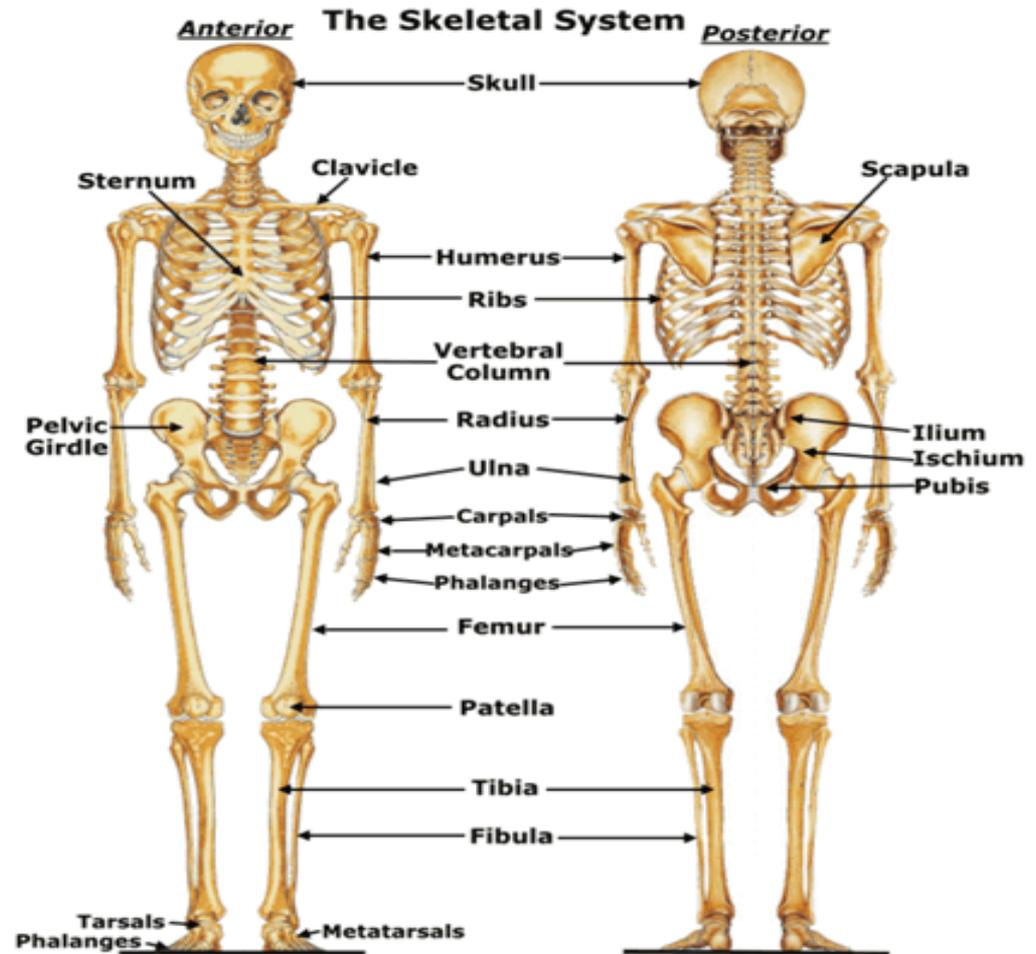
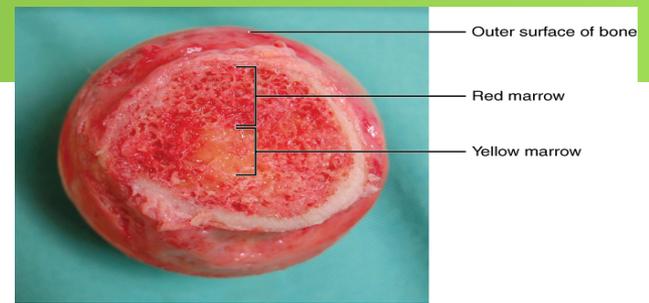
[Human Skeletal System](#)

[Them Not So Dry Bones](#)

from Schoolhouse Rock

[Human Skeletal System: It's ALIVE!](#)

from Crash Course Biology



Reproductive System

System of sex organs within an organism which work together in sexual reproduction.

Many non-living substances such as fluids, hormones, and pheromones are important accessories to the reproductive system.

Unlike most organ systems, the sexes of differentiated species often have significant differences.

These differences allow for a combination of genetic material between two individuals.

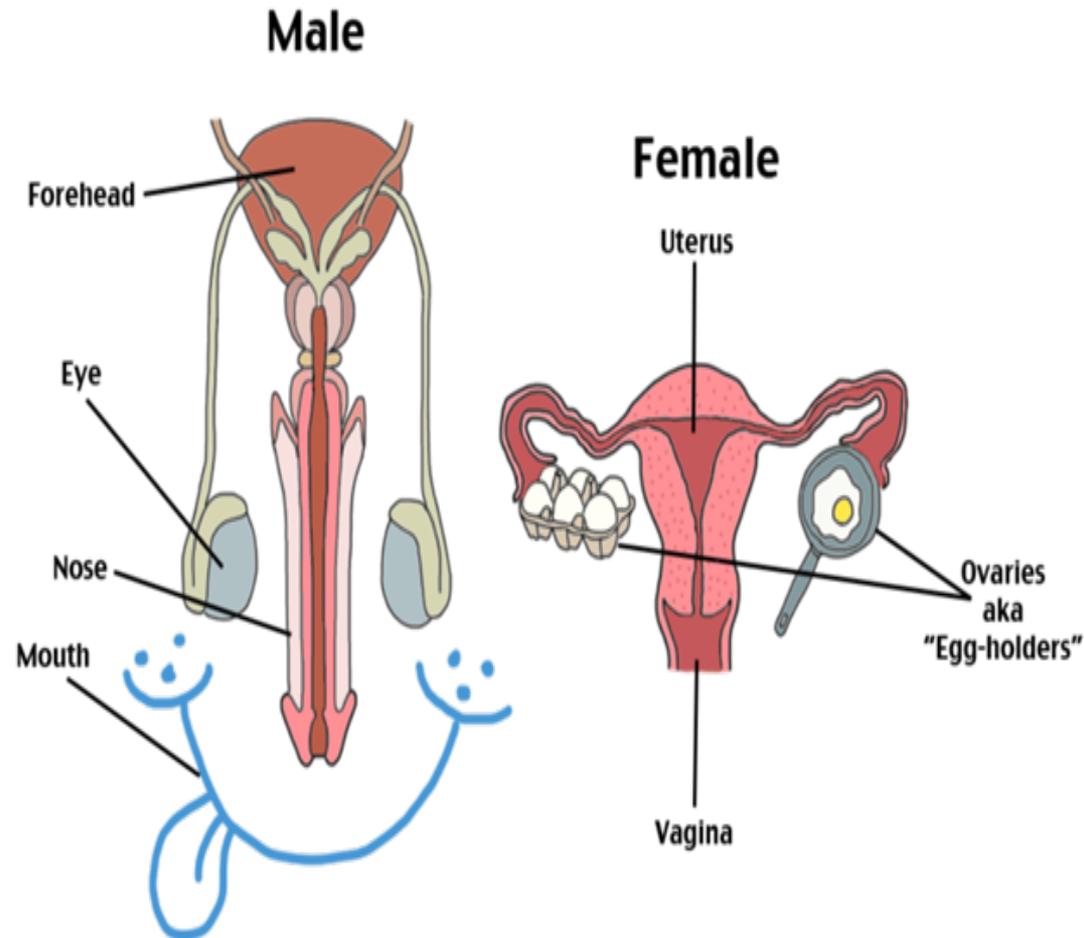
Video links:

[Reproductive System Song](#)

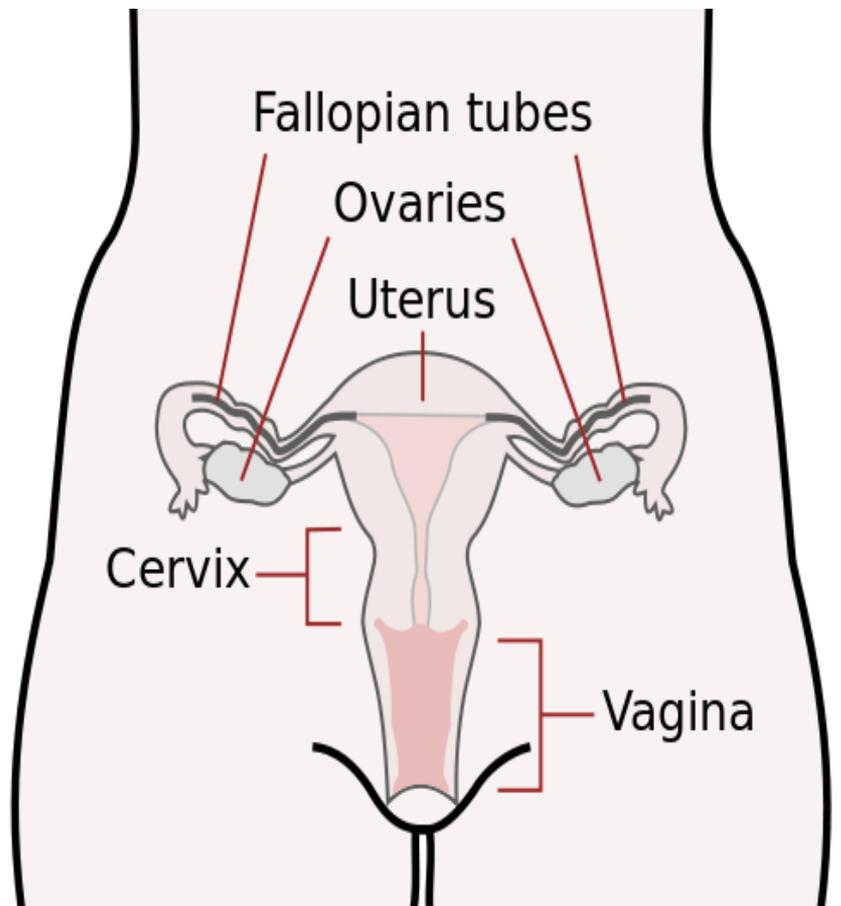
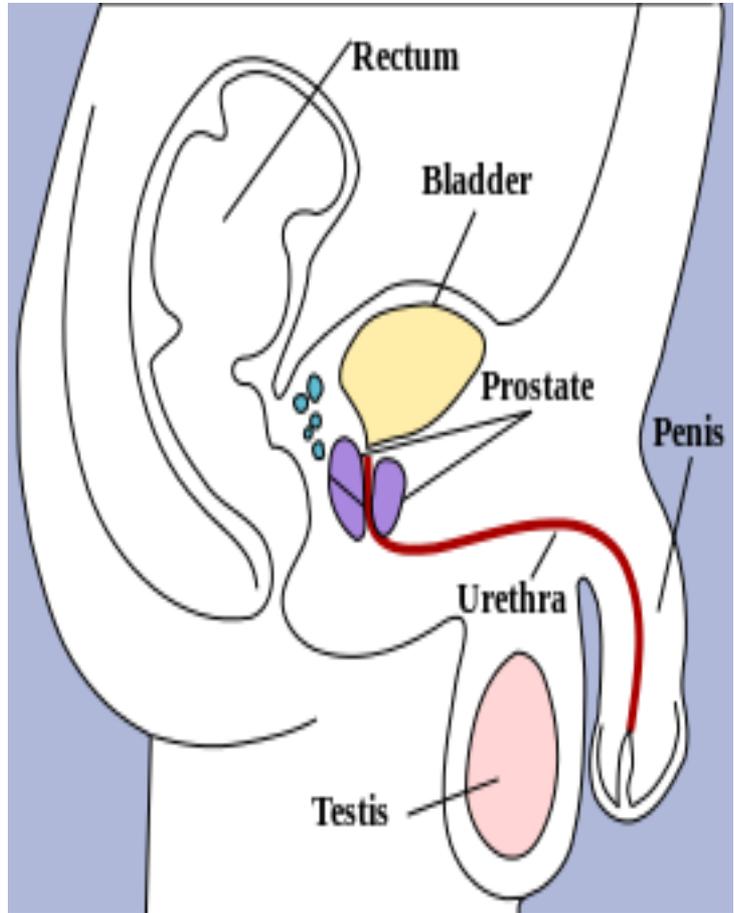
[Reproductive System:](#)

How Gonads Go

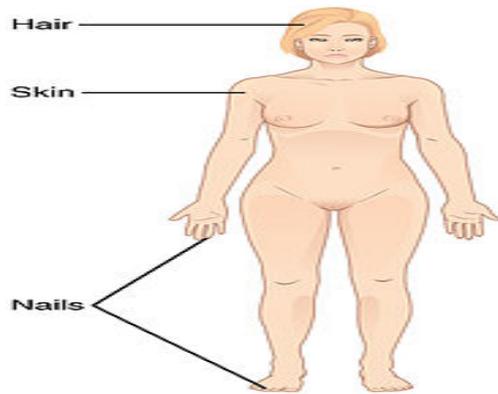
from Crash Course Biology



Reproductive System

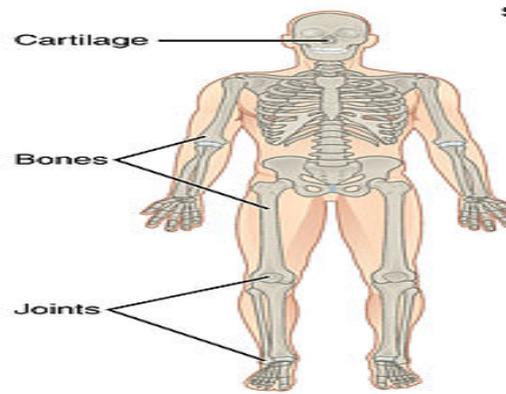


Organ Systems of the Human Body



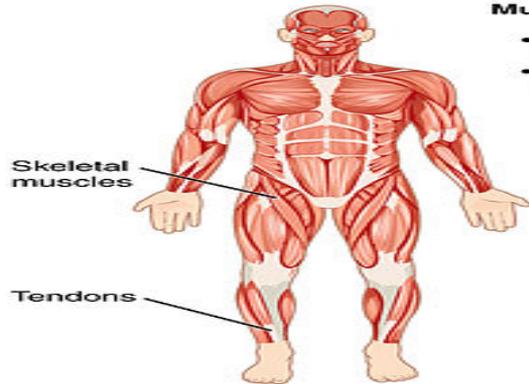
Integumentary System

- Encloses internal body structures
- Site of many sensory receptors



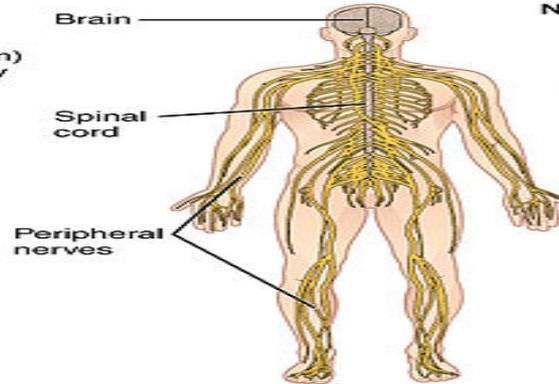
Skeletal System

- Supports the body
- Enables movement (with muscular system)



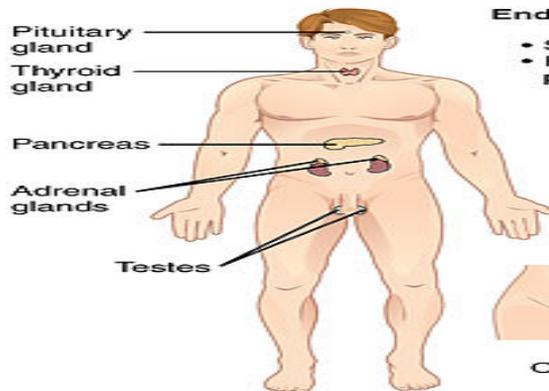
Muscular System

- Enables movement (with skeletal system)
- Helps maintain body temperature



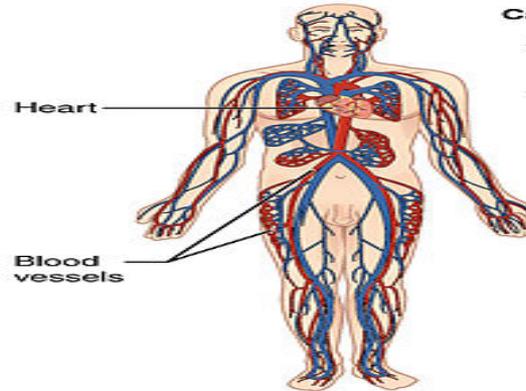
Nervous System

- Detects and processes sensory information
- Activates bodily responses



Endocrine System

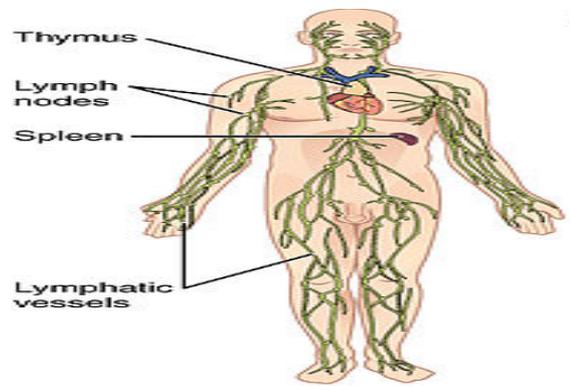
- Secretes hormones
- Regulates bodily processes



Cardiovascular System

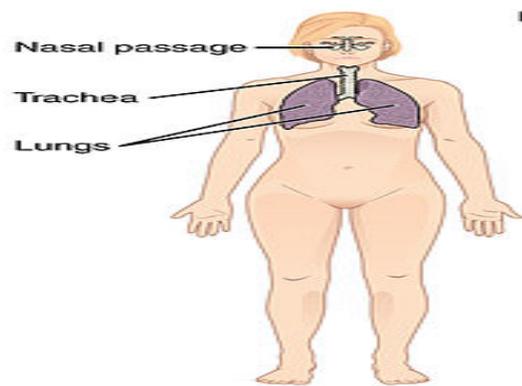
- Delivers oxygen and nutrients to tissues
- Equalizes temperature in the body

Organ Systems of the Human Body



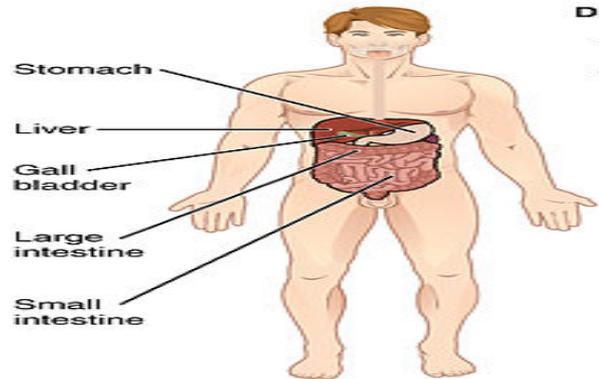
Lymphatic System

- Returns fluid to blood
- Defends against pathogens



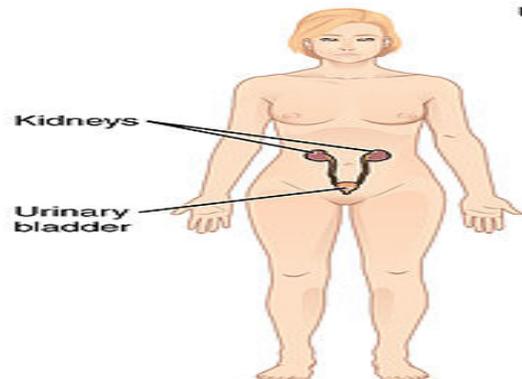
Respiratory System

- Removes carbon dioxide from the body
- Delivers oxygen to blood



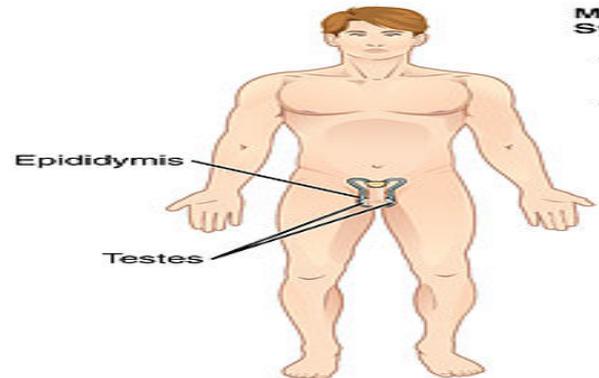
Digestive System

- Processes food for use by the body
- Removes wastes from undigested food



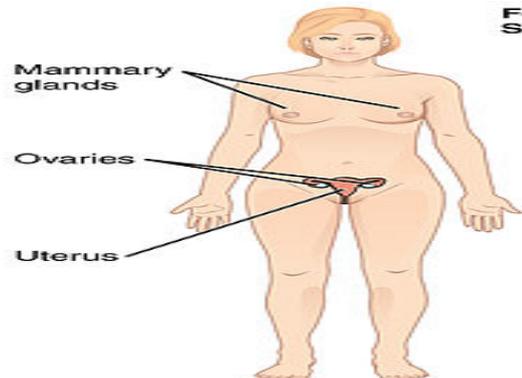
Urinary System

- Controls water balance in the body
- Removes wastes from blood and excretes them



Male Reproductive System

- Produces sex hormones and gametes
- Delivers gametes to female



Female Reproductive System

- Produces sex hormones and gametes
- Supports embryo/fetus until birth
- Produces milk for infant

Confused?

Here are some links to fun resources that further explain Human Organ Systems:

- [Anatomical Terms of Direction and Planes of Section](#) from the Penguin Prof
- [Anatomical Planes and Spatial Relationships in the Human Body video](#) from Interactive Biology.
- [Interactive Tutorial on Human Organs](#), from BBC Science: Human Body & Mind.
- [Human Anatomy Systems](#) from InnerBody.com.
- [Human Body 101 video](#) from National Geographic.
- See the many other Organ System videos and animations linked on previous slides!

(You must be in PPT slideshow view to click on links.)

Smart Links

