

Anatomy & Physiology

- 2 **Digestive System**
- The materials the body needs to keep running properly are extracted through complicated processes from consumed food and drink.
- 3 **Digestive System**
- These chemicals are then sent throughout the body to help repair, rebuild, and replace that which the body has burned, used, or discarded.
- 5 **The Mouth**
- Digestion begins in the mouth.
 - The instant food enters the mouth, the salivary glands send in secretions to begin breaking down starches into usable sugar.
- 11 **Liver, Gallbladder, Pancreas**
- The gallbladder and pancreas connect to the duodenum.
- 12 **Liver, Gallbladder, Pancreas**
- Bile is used to break down fats.
 - Bile is made in the liver and stored in the gallbladder.
- 13 **Liver, Gallbladder, Pancreas**
- The pancreas releases enzymes into the duodenum to digest food.
 - The pancreas also releases insulin into the blood stream to regulate blood glucose levels.
- 14 **Small Intestine**
- Lining the inside of the small intestine are finger-like projections called villi.
 - The villi absorb the nourishing chemicals.
- 15 **Small Intestine**
- Blood vessels carry these chemicals to all parts of the body.
- 17 **Large Intestine**
- The large intestine is about 5 feet long.
 - Water is absorbed in the large intestine.
- 18 **Digestive System**
- The entire digestive system is a flexible, mucus-lined muscular tube about 24 to 36 feet long.
- 23 **Digestion Time**
- After putting food into your mouth, the bolus then has to travel

through the entire gastrointestinal tract before coming out the other end.

- The gastrointestinal tract includes the oral cavity, the esophagus, stomach, small intestine, and large intestine.

24 **Digestion Time**

- Food travels down the esophagus at a rate of approximately 3 to 4 centimeters per second.
- The entire process takes about 5 to 6 seconds.

25 **Digestion Time**

- In the stomach, food tends to hang around for a little longer.
- This depends on a variety of factors including the amount of food you have consumed, how much fat it contains, and also the acidity of the stomach.
- However, all food should have left the stomach within 2 to 4 hours.

26 **Digestion Time**

- In the small intestine, digestion continues and absorption occurs.
- From here on, the time to defecation will vary depending on the time it takes to adequately digest and absorb in the small intestine. This will usually take 5 to 6 hours.

27 **Digestion Time**

- The food then enters the large intestine for further digestion and water reabsorption before defecation.
- The time from entering the colon to defecation is about 12 to 24 hours.

28 **Digestion Time**

- The time for food to travel from one end to the other probably ranges from about 20 to 30 hours.
- Foods high in protein and fats take a little longer to pass through than carbohydrates.

2 **THE EXCRETORY SYSTEM**

- The excretory system helps to remove body waste safely.
- The kidneys act like filters.

3 **KIDNEYS**

- The two kidneys are located near the spine in the middle of the back.
- They are protected by lower ribs and covered by layers of fat.

4 **KIDNEYS**

- Without the kidneys, it would not take long before the body's system would be poisoned by its own waste.
- It is possible to function with only one kidney.

5 **URINE**

- Waste drains out of the kidneys in the form of urine.
- Urine is about 95% water and 5% urea (protein from protein breakdown).
- Fresh urine has no bacteria in it. It is quite clean (probably cleaner than your hands).

- 2 **Circulatory System**
 - The circulatory system is composed of a group of organs which transport food and oxygen to and remove waste from every cell in the body.
 - An adult human contains about ten pints of blood.
- 4 **Blood**
 - Blood is made up of a solid part (the cells) and a liquid part (plasma).
 - The solid part is made up of red and white blood cells and blood platelets.
- 5 **Red Blood Cells**
 - Red blood cells carry oxygen from the lungs and carbon dioxide to the lungs.
- 6 **Red Blood Cells**
 - Red blood cells are produced mainly in bone marrow.
 - Your bones produce about one-half cup of red blood cells daily.
 - Red blood cells only live about 100-120 days.
 - Aged, damaged, or abnormal cells must be replaced.
- 7 **White Blood Cells**
 - White blood cells destroy bacteria and help repair tissue.
 - Humans have about one white blood cell for every 600 red blood cells.
- 8 **Plasma**
 - The liquid portion of the blood is plasma.
 - It is about 90% water and contains protein and dissolved salts.
- 9 **The Heart**
 - The heart acts as the pump of the circulatory system.
 - It keeps the blood moving endlessly through the body.
 - There are four main parts of the heart which are divided into two distinct halves-right and left.
- 10 **Atria**
 - Inside each half are two chambers.
 - The top one is the atrium which receives the blood and acts as a tiny reservoir.
- 11 **Ventricles**
 - When the heart relaxes, the blood is pulled into the lower

chamber called the ventricle.

- A valve, like a one-way door, keeps the blood from backing up into the atrium.

12 **Ventricles**

- When the heart contracts, the blood is pushed out of the heart.
- Another valve keeps the blood from running back into the ventricle.

13 **Heartbeat**

- The "heartbeat" that is heard through a stethoscope is the opening and closing of these valves.

15 **Arteries & Veins**

- The veins carry blood to the heart and appear to be a darker color because of the lack of oxygen.
- The arteries carry blood away from the heart and are rich in oxygen from the lungs.
- Arteries are bright red in color.

16 **Circulatory System**

- After blood completes its journey through the heart, it is in the left ventricle.
- From there, it is ready to flow into the aorta for its trip around the body.

17 **Circulatory System**

- Since this trip is so much longer than the round trip to the lungs, the left ventricle must pump much more powerfully than the right.
- This is why the heartbeat is felt on the left side of the body even though the heart is in the center of the body.
- The muscles are also much thicker on the left side.

18 **Circulatory System**

- After oxygenated blood reaches the aorta, it flows into branch arteries leading to the head, arms, stomach, intestines, liver, kidneys and all inside organs.
- Other branches carry blood into the legs and feet.

19 **Capillaries**

- It travels first in large arteries, then smaller ones, and finally into the tiniest blood vessels of all—the capillaries.

- Here it drops its food and oxygen and picks up waste products from the body cells.

20  **Circulatory System**

- It is now deoxygenated blood and is dark red or bluish In color.
- It passes into tiny veins that lead to larger veins and finally back into the right atrium.
- This complete trip takes less than a minute to complete.

2 **Respiratory System**

- The respiratory system brings oxygen into the body and removes carbon dioxide and other gases.

3 **Throat**

- The air one inhales passes through the pharynx at the back of the throat and through the larynx (voice box).
- The larynx is sometimes called the Adams Apple.

4 **Trachea**

- From there, air moves down the trachea.
- There is a flap of skin, the epiglottis, at the top of the trachea that snaps shut to prevent food from entering and causing choking.
- The cleaned air then passes into two bronchial tubes.

5 **Chest Cavity**

- Inside the trunk is the chest cavity.
- Most of this area is filled with lungs that are actually the size of a pair of footballs.
- The floor of this 'room' is called the diaphragm.

6 **Bronchi**

- The bronchial tubes take air directly into and out of the lungs.
- Each bronchi divides into many smaller tubes which narrow more and more until they end in the alveoli-the tiny air sacs that fill the lungs.

7 **Alveoli**

- There are about 600 million of these tiny sacs.
- This is where oxygen from the air passes into the blood and carbon dioxide passes out of the blood into the air sacs.
- This waste gas is passed out of the body when one exhales.

- 2 **Nervous System**
- The nervous system has two main divisions:
 - central nervous system
 - peripheral nervous system
- 3 **Central Nervous System**
- The central nervous system consists of the brain and the spinal cord.
 - It controls behavior.
- 7 **Peripheral Nervous System**
- The peripheral nervous system includes the nerves which come from the spinal cord and the base of the brain to the different parts of the body.
- 8 **Peripheral Nervous System**
- The peripheral nervous system is the pathway to the brain for the five senses.
- 9 **Peripheral Nervous System**
- By sending messages to and from the brain, the nervous system keeps the numerous parts and organs of your body working together-helping you respond to the world around you.
- 10 **Peripheral Nervous System**
- The peripheral nervous system serves the internal organs and controls such activities as digestion, excretion, respiration, circulation, reproduction, and endocrine gland activity.
- 11 **Neurons**
- The individual nerve cell, or neuron, is the basic unit that carries out the work of the nervous system.
- 16 **Neurons do not grow back!**
- Brain cells cannot grow back once destroyed by injury, disease, drugs/alcohol, or birth defects.
 - The damage is irreversible.
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- 2 **Muscular system**
 - Nearly half of body weight is muscle weight.
 - The 206 bones of the skeletal framework are covered by nearly 650 muscles.
- 3 **Muscle fibers**
 - Muscles are composed of many bundles of stringy fibers bound together in bunches.
- 4 **Tendons & ligaments**
 - Muscles are connected to bones by tendons, which are tough, elastic-type bands of connective tissue.
 - Bones are connected to each other by ligaments.
- 5 **Muscle Contraction**
 - Muscles, when stimulated by a nerve to act, contract and produce body heat.
- 6 **Muscles work in pairs**
- 7 **Lactic Acid Fermentation**
 - Muscles also produce a chemical called lactic acid if the muscles work a long time.
 - This acid causes muscles to become tired.
- 8 **Exercise**
 - In order to strengthen muscles, plenty of daily, vigorous exercise for short periods, with gradually more effort each time, is necessary.
 - Muscle fiber increases in size with use - not in number as once thought.
 - Muscles not exercised will shrivel and become weak.
 - This deterioration can happen over a short period of time.
- 9 **3 Types of muscles**
 - Skeletal Muscle
 - Smooth Muscle
 - Cardiac Muscle

2  **SKELETAL SYSTEM**

- ⊙ The framework of the body is the bony and flexible skeleton.
- ⊙ It is made up of 206 bones.
- ⊙ Bones contain living tissue, cells, blood vessels, mineral deposits which provide hardness, and water.

4  **BONES ARE HALLOW**

- ⊙ Most of the bones are porous and hollow.
- ⊙ This makes bones weigh less and makes it easier for us to get around.
- ⊙ Bones are amazingly strong for their weight.
- ⊙ Because they are porous, bones are resilient and resistant to blows and shocks.

8  **MILK DOES A BODY GOOD**

- ⊙ Bones are made up mostly of a special balance of calcium and phosphorus salts obtained from the diet.
- ⊙ If the ratio of required substances is upset by an improper diet, the bones may grow too hard and brittle, or may become too soft and bend.
- ⊙ A proper diet is necessary to maintain strong, healthy bones.

9  **I'VE FALLEN, AND I CAN'T GET UP!**

- ⊙ As people age, their bones become lighter and more brittle because calcium seeps out of the bones gradually.
- ⊙ For this reason, older people may break bones more easily than younger people.