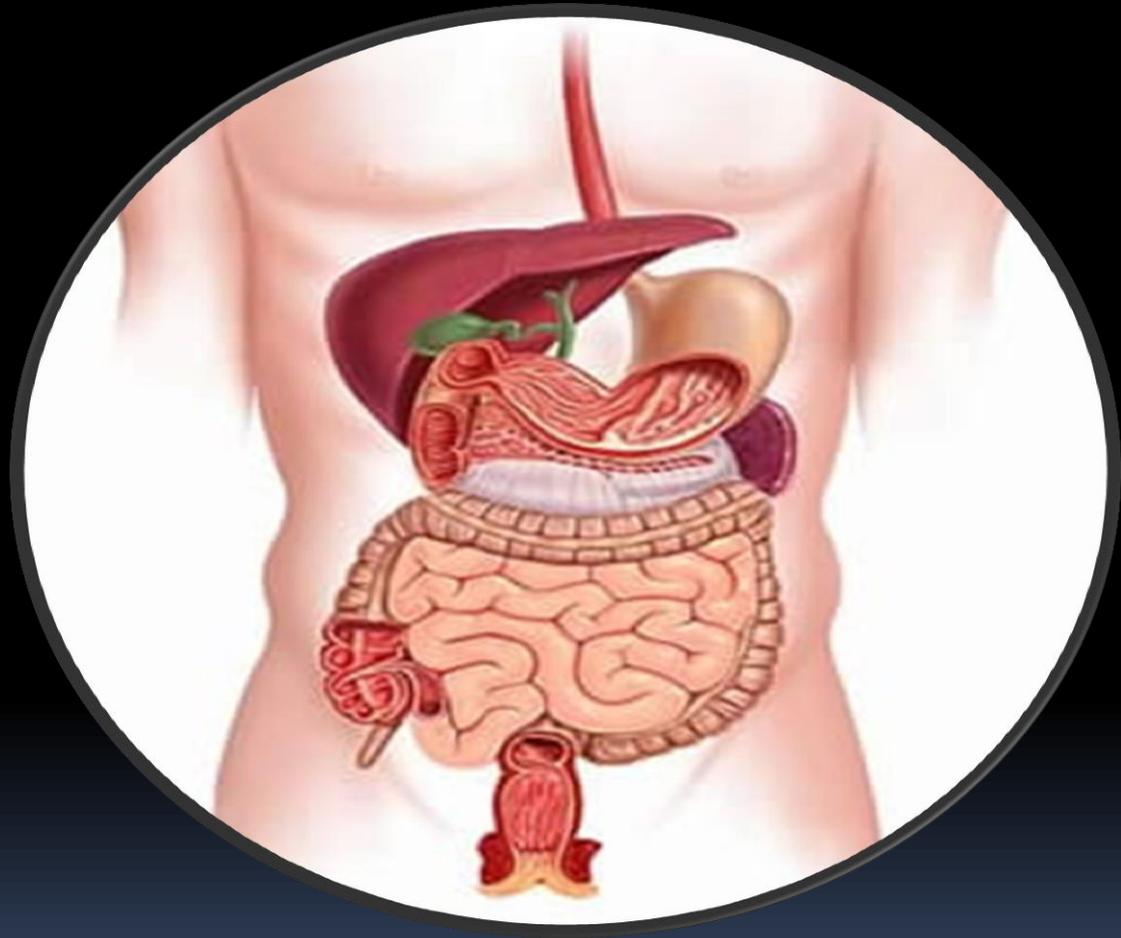




Physiology of Digestive System

5th Lecture

2nd Term



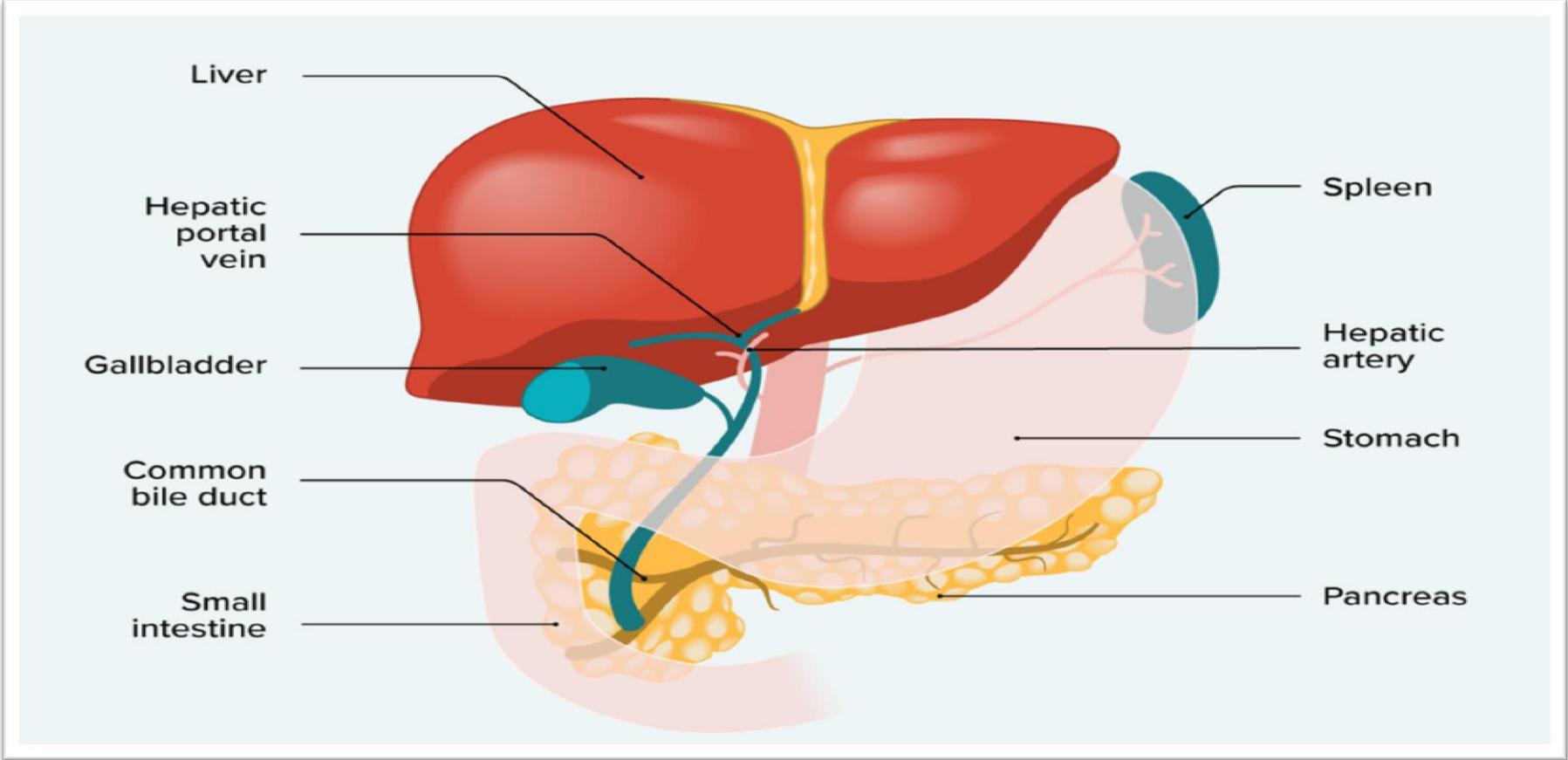
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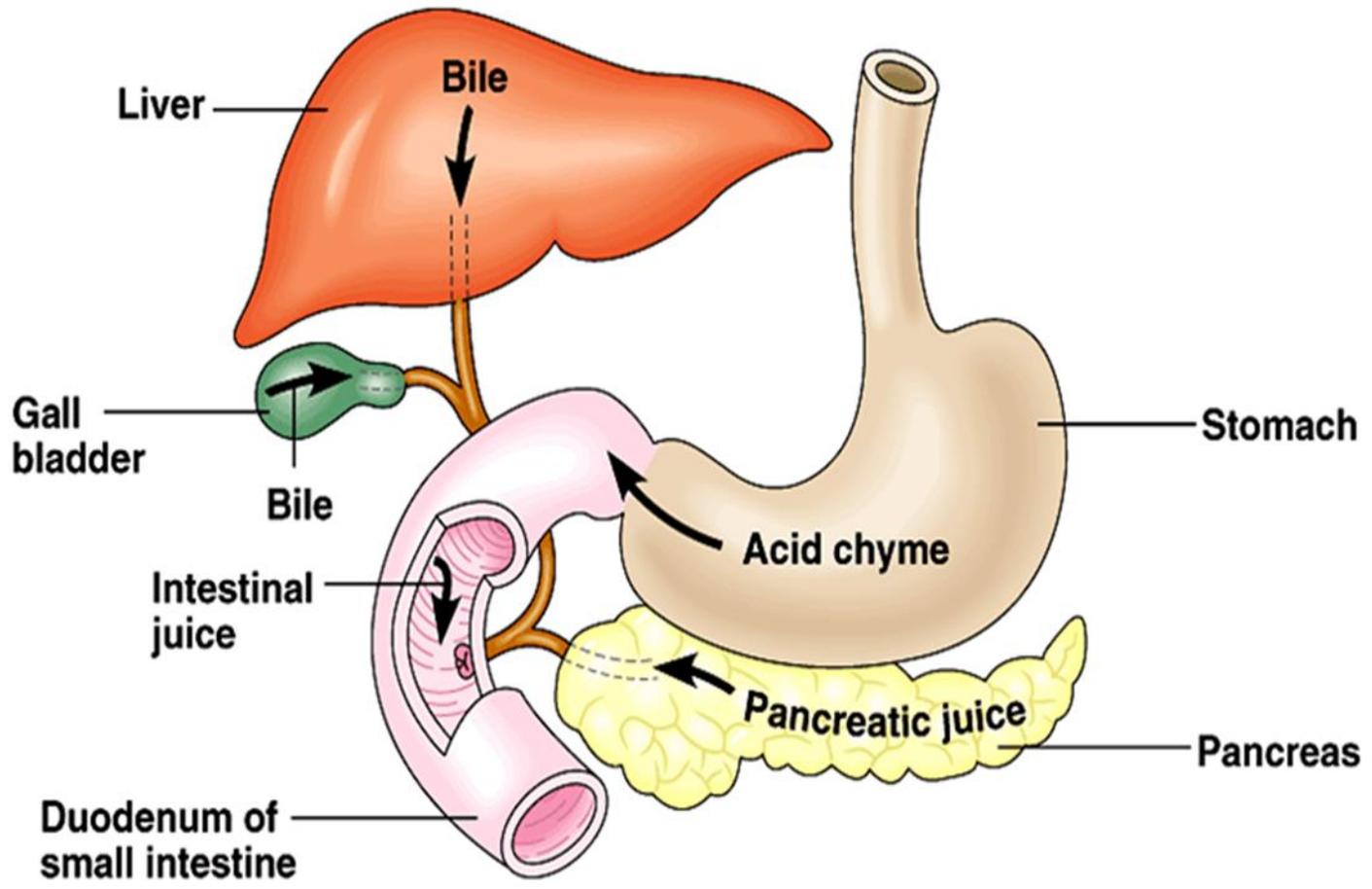
The liver plays a role in nearly every organ system in the body. It interacts with the endocrine and gastrointestinal systems by aiding in digestion and metabolism. The liver is the storage location for fat-soluble vitamins and handles cholesterol homeostasis.

It stores iron and copper. It plays a role in hematology with clotting factor and protein synthesis. The liver plays a role in heme breakdown into unconjugated bilirubin and conjugates it. It plays a role in sex hormone metabolism and produces carrier proteins that are important in reproduction and development. Finally, Kupffer cells and Pit cells play an important role in the body's immunologic system.



The primary functions of the liver are:

- **Bile production and excretion.**
- **Excretion of bilirubin, cholesterol, hormones, and drugs.**
- **Metabolism of fats, proteins, and carbohydrates.**
- **Enzyme activation.**
- **Storage of glycogen, vitamins, and minerals.**
- **Synthesis of plasma proteins, such as albumin, and clotting factors.**



Bile Production

Bile is an important fluid as it helps excrete material not excreted by the kidneys and aids in the absorption and digestion of lipids via secretion of bile salts and acids. Bile is produced by hepatocytes and is mainly composed of water, electrolytes, bile salts, bile acids, cholesterol, bile pigment, bilirubin, and phospholipids in addition to other substances. that are not excreted are recycled by conversion into bile acids by gut bacteria for reuse by absorption in the ileum and transport back to the liver.

Bile is secreted from hepatocytes into the bile canaliculi where it travels from smaller ducts to the larger ducts eventually ending up in the duodenum or being stored in the gallbladder for storage and concentration as determined by the duct and sphincter of Oddi pressures.

Following secretion of bile into the duodenum, it undergoes enterohepatic circulation, where it performs its job in the bowel, and bile components

Bilirubin Metabolism

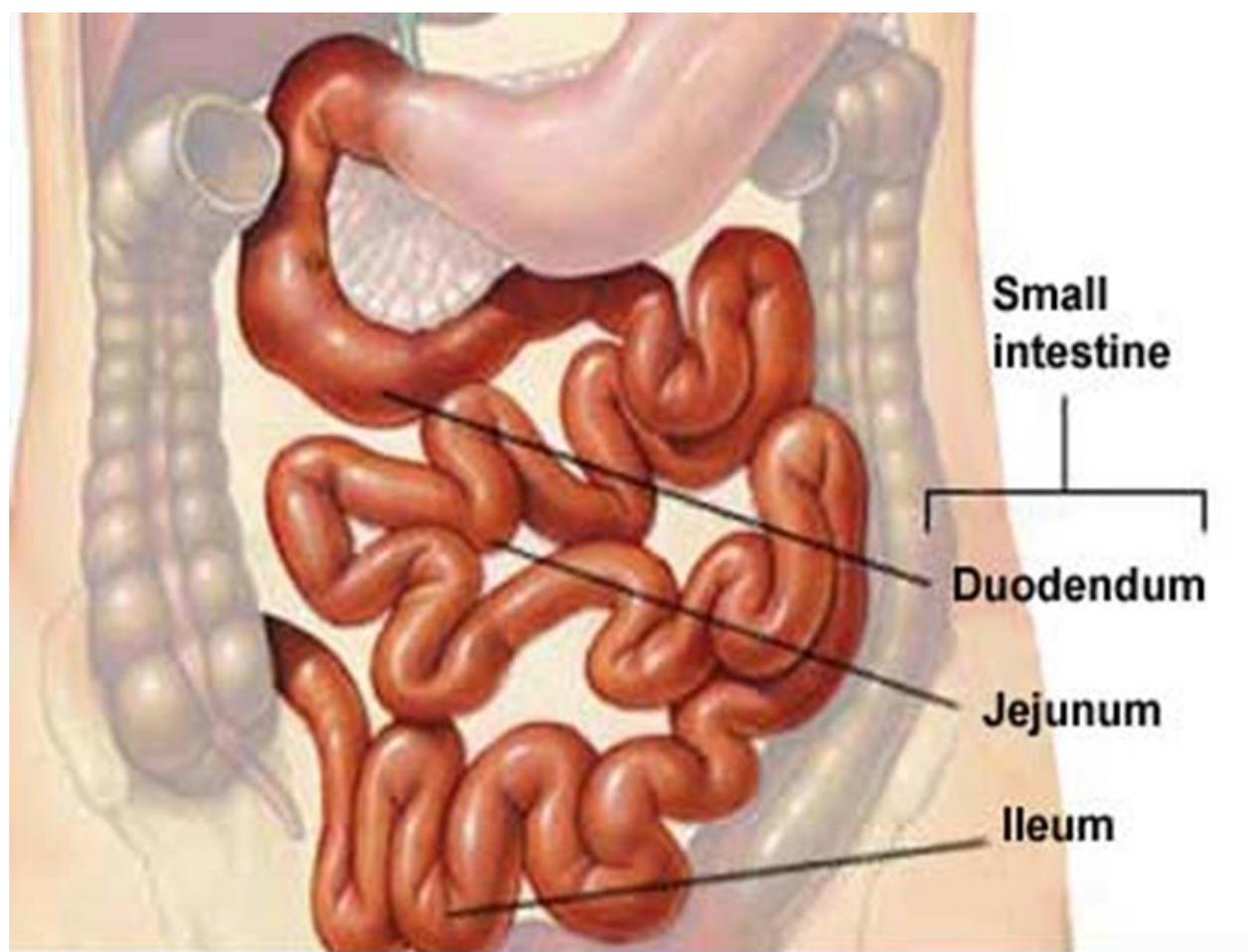
The liver plays a significant role in the breakdown of heme. Hemolysis takes place in multiple locations throughout the body, including the liver, spleen, and bone marrow. Heme is broken down into biliverdin, which is then reduced to unconjugated bilirubin. The liver receives unconjugated bilirubin bound to albumin from the circulation. The unconjugated bilirubin then undergoes conjugation via the uridine diphosphate glucuronyltransferase (UGT) system, a phase II process, to become hydrophilic.

The newly conjugated bilirubin then is secreted via bile canaliculi into the bile or small amounts dissolve in the blood where it then gets filtered for excretion by the kidneys.

Most conjugated bilirubin enters the bile and is excreted with bile in feces as it is not absorbable by the intestinal wall. Some bilirubin is converted to urobilinogen or unconjugated bilirubin by gut bacteria for reabsorption to undergo enterohepatic circulation.

Small intestine

- This is the site of nutrient absorption.
- Small intestines also produce many digestive enzymes to break large polymers completely down into monomers.
(duodenum – jejunum – ileum)
- Alkaline digestion takes place in the upper small intestine, the duodenum.

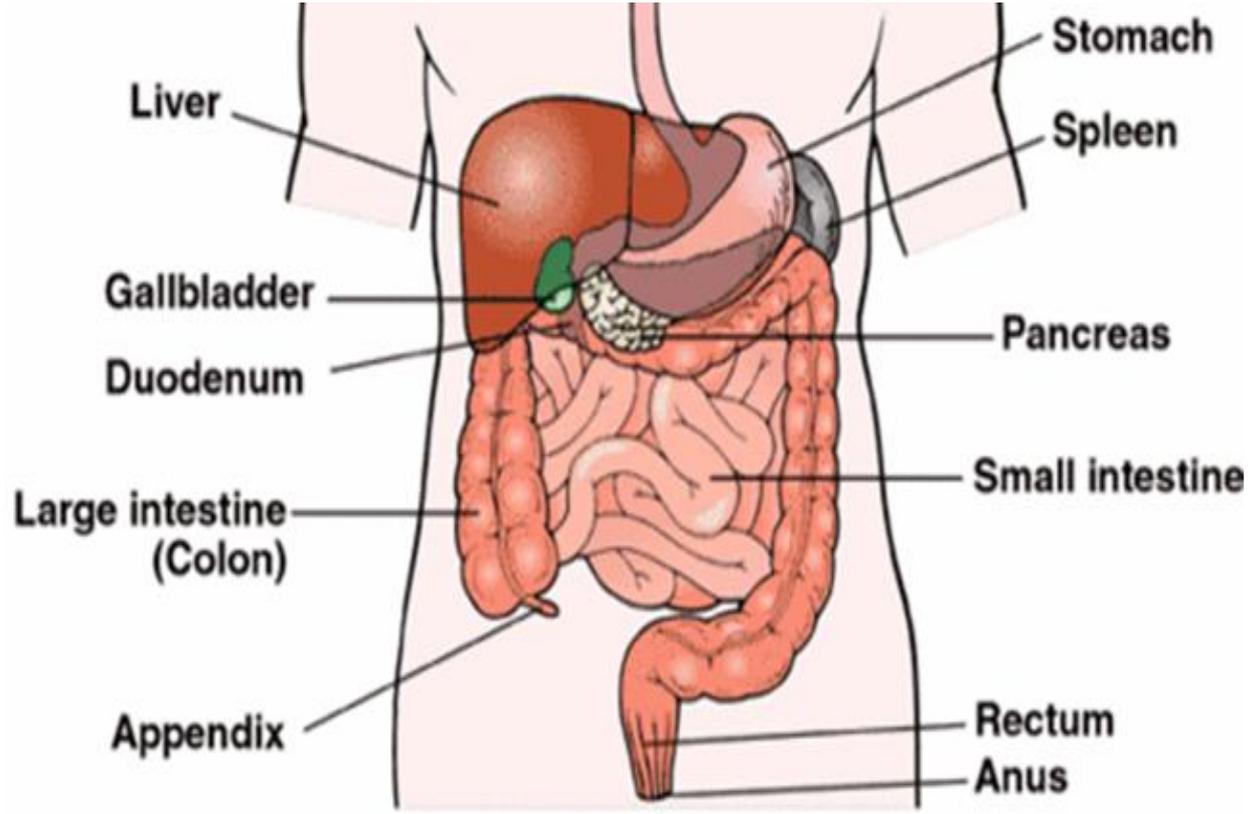


Large intestine

- Water from digested food is absorbed in the large intestine.
- Bacteria present in the large intestine feed on unabsorbed nutrients, and produce several vitamins.
- Fecal material is formed from fiber and other undigested material.

Rectum receive stool from the colon and to hold the stool until evacuation happens.

Anus control movement of stool.



1. How does digested food finally reach the bloodstream?

- a. It passes through the gullet into the blood.**
- b. It is absorbed into the blood through blood vessels.**
- c. It is absorbed into the blood through the walls of the lungs.**
- d. It passes from the small intestine into the large intestine, then into the blood.**

Answer: b

2. The digestive system processes food into usable and unusable materials. The usable materials are sent to the body's cells as food. What happens to unusable materials?

- a. It goes into the pancreas to await disposal.**
- b. It goes into the right ventricle to await disposal**
- c. It goes into the large intestine to await disposal**
- d. It goes into the small intestine to await disposal**

Answer: c

3. Solid waste leaves the body through the rectum then the anus. Liquid waste leaves the body after passing through the.....

- a. Kidneys and bladder.**
- b. Blood vessels and lungs.**
- c. Large intestine and bowel.**
- d. Small intestine and large intestine.**

Answer: a

4. Digestion takes place in a long tube-like canal called the alimentary canal, or the digestive tract. Food travels through these organs in the following order:

- a. Mouth, gullet, stomach, small intestine, large intestine and rectum.**
- b. Mouth, esophagus, stomach, large intestine, small intestine and rectum.**
- c. Mouth, stomach, esophagus, small intestine, large intestine and rectum.**
- d. Mouth, stomach, gullet, small intestine, large intestine and rectum.**

Answer: a

5. Which of the following does NOT manufacture digestive juices?

- a. Liver.**
- b. Kidneys.**
- c. Stomach.**
- d. Pancreas.**

Answer: b

6. The liver is located in the abdomen and performs many functions.

Which of the following is NOT a function of the liver?

- a. Storing food.**
- b. Manufacturing insulin.**
- c. Producing digestive juices.**
- d. Healing itself when it is damaged.**

Answer: b

7. How does food move through your digestive tract?

- a. By gravity**
- b. By wavelike muscle contractions.**
- c. By chemical absorption.**

Answer: b

8. Where does most of the digestive process take place?

- a. Small intestine.**
- b. Large intestine.**
- c. Stomach.**
- d. All of the above.**

Answer: a

9. What does the liver do to help digestion?

- a. Makes important enzymes.**
- b. Neutralizes stomach acid.**
- c. Produces bile.**
- d. Regulates insulin.**

Answer: c

10. Which of these can harm the intestinal lining?

- a. Aspirin.**
- b. Antibiotics.**
- c. Caffeine.**
- d. A and B.**

Answer: d

11. Which of these best maintains intestinal health?

- a. Starches.**
- b. Vitamins.**
- c. Fiber.**
- d. Fat.**

Answer: c

12. Which of these can cause heartburn?

- a. Being overweight.**
- b. Lying down soon after eating large meal.**
- c. Eating high-fat foods.**
- d. All of the above.**

Answer: d

13. Which of these causes ulcers?

- a. Bacterial infection in the stomach.**
- b. Aspirin and other anti-inflammatory medicines.**
- c. Chronic stress.**
- d. A and B.**

Answer: d

14. Food poisoning is caused by eating contaminated food. How can it be prevented?

- a. Cooking meat and poultry thoroughly.**
- b. Washing fruits and vegetables before eating or cooking them.**
- c. Storing food properly.**
- d. All of the above.**

Answer: d

15. How does age affect digestion?

- a. Slows swallowing.**
- b. Overgrowth of bacteria reduces the amount of nutrients the intestines absorb.**
- c. Reduces stomach secretions.**
- d. All of the above.**

Answer: d

16. This is the job of the digestive system:

- a. To give the body shape.**
- b. To take in and break down food for use by the body.**
- c. To take in oxygen and give off carbon dioxide.**
- d. To protect from sun**

Answer: b

17. A long tube that carries food from the mouth to the stomach:

- a. Trachea**
- b. Esophagus**
- c. Urethra**
- d. Epiglottis**

Answer: b

18. Stores the liver's digestive juices until they are needed by the intestines:

- a. Pancreas**
- b. B. Gall bladder**
- c. Villi**
- d. Kidney**

Answer: B

19. The place where digested molecules of food, water, and minerals are absorbed.

- a. Small intestine**
- b. Large intestine**
- c. Mouth**
- d. Kidney**

Answer: B