

Study Questions – Digestive System

1. What is the function of the digestive system?
2. What are the 2 main anatomical divisions of the digestive system?
3. What is the sequence of segments that food passes through the alimentary canal? Where are the accessory organs located and to which part(s) of the alimentary canal are they anatomically/ physiologically associated?
4. Define each of the 6 essential activities that take place in the alimentary canal.
5. From the lumen to the outermost layer of the alimentary canal list the 4 layers, state the type of tissue(s) that make up these layers, and the function of these layers.
6. Describe the anatomy of the peritoneum and its function.
7. What and where are the receptors, control centers, and effectors of the digestive system?
8. Provide examples of types of stimuli that activate the 2 different classes of receptors of the digestive system.
9. How do the 3 different effectors respond to stimuli (that previously activated a receptor)?
10. What is the sequence of the 3 phases of digestion?
11. What stimulations occur during the cephalic phase of digestion? What is the importance of the cephalic phase? What division of the nervous system is activated during the cephalic phase? What effectors are stimulated during the cephalic phase? How do these effectors respond to this stimulation?
12. List and provide the function of 3 proteins that are found in saliva.
13. Which of the 6 essential activities of digestion occur in the mouth? What structures/organs in the mouth are responsible for each of these activities? What is the end result of digestion in the mouth?
14. List from the esophagus to the duodenum, the 5 anatomical regions of the stomach. What is the major function of each of the 2 sphincters? What medical condition could result if either of these sphincters did not function normally?
15. Describe the structural features of the stomach which serve to maximize the surface area contact to the food in the stomach?
16. What are the 2 main exocrine products of the stomach that promote digestion? From what cells are these products secreted? Where are these cells located? What is the function of each of these exocrine products? What stimulates these cells during each of the cephalic and the gastric phases of digestion?
17. What is the hormone that is secreted by the stomach? From what cell is it secreted? Where is the cell located? What stimulates the secretion of the hormone? What is the target for the hormone? How does the target respond to the hormone? What is the significance of this response?
18. What type of propulsion is exhibited in the stomach? What tissue is responsible this propulsion? What is the purpose (effect) of the propulsion? What stimulates the propulsion during each of the cephalic and gastric phases? How does chyme exit the stomach and enter the duodenum through a closed pyloric sphincter? What stimuli in the alimentary canal result in the inhibition of the propulsion (smooth muscle contraction) of the stomach? How is the propulsion of chyme in the stomach inhibited during the intestinal

phase (2 answers)? Why is it important to control the rate at which the stomach empties into the small intestine?

19. List from the stomach to the large intestine, the 3 anatomical segments of the small intestine. Generally, what digestive processes occur in each segment?
20. Describe the 3 structural features (in order of size) of the small intestine that provide a very large increase in surface area to the mucosa. Why are these features advantageous?
21. If you were to make a cross section in a villus, what would you find in the center? What is the function of these structures?
22. List and describe the functions of the 2 main types of epithelial cells in the small intestine mucosa.
23. Describe the term brush-border? What is its significance in the digestive system?
24. What are the hormones that are secreted by the small intestine? What stimulates the secretion of each hormone? What are the targets for each hormone? How do the targets respond to each hormone? What is the significance of these responses?
25. What cells in the pancreas synthesize and secrete pancreatic juice? What are the 2 basic components of pancreatic juice? What are the enzymes that are secreted by the pancreas and what are their respective substrates? Where do these enzymes function? What do these enzymes turn their respective substrates into (what are the end-products of hydrolysis)? What does bicarbonate do (and where)? What directly stimulates the acinar cells to secrete each component of pancreatic juice during the cephalic and intestinal phases? What is the significance of the secretion of pancreatic juice?
26. What is the function of bile? Describe the process of emulsification. Where is it synthesized? Where is it stored? What stimulates its movement out of its storage site into the alimentary canal?
27. How do pancreatic juice and bile enter the alimentary canal? What controls/prevents their entry? How is this access opened?
28. Describe how each of the 4 major macromolecules are hydrolyzed in the small intestine. How are pancreatic proteases activated?
29. Describe how polar molecules are absorbed out of the lumen of the alimentary canal. What body fluid do they enter? What organ do these molecules go to first?
30. Describe how non-polar molecules are absorbed out of the lumen of the alimentary canal. Describe the creation of a chylomicron. What body fluid do they enter?
31. Describe how water is absorbed out of the lumen of the alimentary canal.
32. For each of the 6 digestive activities, describe where, when, why and how they occur within the various segments of the alimentary canal.
33. When is your body in the absorptive state? Postabsorptive state? What is the difference in the levels of metabolites in the blood during each state?
34. What organ secretes hormones to control blood glucose levels during the Absorptive and Postabsorptive states? Name the 2 hormones and the cells from where they are secreted. Where are these cells found within the organ? What stimulates the secretion of each hormone? What are the targets for each hormone?

What are the responses of the targets to each hormone (how are these targets capable of changing blood glucose levels)? What is the significance of the responses by each target?

35. Define the 5 symptoms exhibited with individuals with diabetes mellitus. What is the difference between Type I and Type II in their cause and treatment?