

47 MCQs on GI and Nutrition Physiology

You have 47 questions in this exam.

1. Which of the following is NOT a characteristic of the myenteric ganglia of the enteric nervous system?
 - A. Also known as Auerbach's plexus
 - B. Contains most of the motor neurons to circular and longitudinal muscles of the intestinal tract
 - C. It is smaller than the submucosal ganglia and most prominent in the small and large intestine
 - D. It is interconnected with the submucosal ganglia.
 - E. Contains both excitatory and inhibitory motor nerves to the smooth muscle fibers.

2. The enteric or intrinsic nervous system includes all of the following except:
 - A. The same number of neurons as the spinal cord.
 - B. Motor programs and reflex circuits.
 - C. Sensory neurons capable of detecting chemical, mechanical and thermal conditions in the GI tract.
 - D. Vagus innervation to the esophagus, stomach, and pancreas.

3. Which of the following best describes a fast EPSP synaptic event?
 - A. The depolarization persists several seconds to minutes after the termination of the presynaptic transmitter release.
 - B. Acetylcholine activation of nicotinic cholinergic post-synaptic receptors results in a depolarization lasting less than 50 msec.
 - C. requires K⁺ channel closure
 - D. requires K⁺ channel opening

4. Which of the following statements correctly describes a function of the parasympathetic innervation of the GI tract.
 - A. Norepinephrine is the primary excitatory neurotransmitter.
 - B. Excessive parasympathetic activity can lead to a pathological state called paralytic ileas.
 - C. Inhibitory efferent Vagal innervation causes sphincters to contract.
 - D. Afferent sensory input is received in the nucleus of the solitary tract and processed in the dorsal motor nucleus of the medulla oblongata.
 - E. Glucose concentration, pH, osmolality, movement of material past mechanoreceptors, and level of contractile strength or stretch are monitored by efferent parasympathetic fibers.

5. Muscles in the propulsive and receiving segments of the GI tract respond differently to food movement through the gut. Which of the following statements correctly describes activity in the propulsive segment?

- A. The circular and longitudinal muscles are contracted.
- B. The longitudinal muscles are contracted and the circular muscles are relaxed.
- C. Both the longitudinal muscles and circular muscles are relaxed.
- D. The circular muscles are contracted and the longitudinal muscles are relaxed.

6. The interstitial cells of Cajal:

- A. fire action potentials to initiate the electrical slow waves propagating along the GI tract.
- B. Are found between the longitudinal and circular smooth muscle layers.
- C. Hormonally regulate peristalsis.

7. Circular smooth muscle in the the GI tract:

- A. Accounts for the majority of smooth muscle in the stomach and intestine.
- B. Are coupled via gap junctions which increases the resistance and slows electrical signals through the fibers.
- C. Generates less propulsive force than longitudinal smooth muscle.

8. Which of the following is characteristic of the segmenting movements in the small intestine?

- A. It decreases particle size, which increases the surface area for digestion.
- B. It brings the products of digestion to the mucosal surface for absorption.
- C. It results in the mixing of the luminal contents in front of the propulsive segments (i.e. in the receiving segments)
- D. All of the above.

9. Which of the following sphincters does NOT prevent reflux of material?

- A. Lower esophageal sphincter
- B. Gastroduodenal sphincter.
- C. Ileocolonic sphincter
- D. Internal anal sphincter.

10. Which of the following is NOT involved in swallowing?

- A. Contracture of the upper esophageal sphincter.
- B. Coordination by the swallowing center in the medulla oblongata.
- C. The approximation of the vocal cords to close the glottis.
- D. The raising of the larynx to close its entrance.
- E. The elevation of the soft palate to close the nasopharynx.

11. Which of the following swallowing disorders results from the failure of organized peristaltic behavior, or the simultaneous contraction all along the smooth muscle.

- A. Diffuse spasm.
- B. Dysphasia
- C. Achalasia.
- D. Myelphasia.
- E. Trachiasia.

12. Choose the correct listing of the anatomical divisions of the stomach in the direction food normally passes.

- A. Corpus, fundus, antrum.
- B. Fundus, antrum, corpus.
- C. Antrum, corpus, fundus.
- D. Fundus, corpus, antrum.
- E. Corpus, antrum, fundus.

13. Which of the following is true of smooth muscle in the proximal stomach?

- A. It has no action potentials.
- B. It contracts phasically.
- C. Its main purpose is to grind and mix food prior to propelling it to the gastroduodenal junction.
- D. Receptive relaxation is controlled by decreasing activity of excitatory vagal neurons.

14. Many factors influence the gastric action potential of the stomach. Which of the following is false?

- A. Acetylcholine, gastrin, and cholecystokinin increase amplitude of the plateau phase.
- B. Gastrin increases AP frequency.
- C. The initial contraction coincides with the plateau phase while the trailing contraction coincides with the rising phase of the AP.
- D. Epinephrine and VIP decrease the amplitude of the plateau phase.
- E. It is a single action potential originating in the oral boundary of the distal stomach.

15. Emptying gastric contents into the small intestine is strictly controlled. Which of the following is most accurately represents this concept?

- A. High caloric meals empty faster.
- B. Liquid and solid meals empty at the same rate.
- C. Higher acidity in the stomach results in a slower rate of emptying.
- D. Tonicity of the gastric solution doesn't affect the rate of emptying.

16. How is the MMC controlled?

- A. Ingestion of food ends MMC at all points in the intestine.
- B. IV feeding ends MMC.
- C. Gastrin and CCK terminate MMC in stomach and entire small intestine.
- D. Vagal innervation completely controls MMC.
- E. The MMC increases in speed as it reaches the ileum.

17. What is the difference between normal peristalsis of the SI and giant migrating contractions?

- A. Normal peristalsis only propagates a short distance.
- B. Because of the distance giant migrating contractions travel, they contribute significantly to mixing chyme.
- C. Normal peristalsis can be initiated by vinegar on the mucosa, parasites, enterotoxins, and ionizing radiation.
- D. Normal peristalsis helps strip lumen clean as it travels.
- E. Normal peristalsis is sometimes associated with abdominal cramping and diarrhea.

18. Which best describes the motility in the large intestine?

- A. Food clears the LI in about the same time as it takes to clear the small intestine.
- B. Of the parts of the large intestine, chyme spends the least time in the ascending colon.
- C. The ascending colon consists of haustra that aid in storage and dehydration of feces.
- D. Remnants of meals stay in the LI for approximately 6-8 days.
- E. Receptive relaxation allows the transverse colon to accept chyme without significantly increasing the pressure.

19. Power propulsion is controlled by many factors in the large intestine. Which of the following is NOT one of them?

- A. Castor oil acts on mucosal receptors to initiate it.
- B. May be triggered by ileal chyme delivery to the ascending colon.
- C. Can be triggered by parasites, enterotoxins, and food antigens.
- D. Normally starts in middle of transverse colon after the relaxation of circular muscles and downstream disappearance of haustral contractions.
- E. The influx of material will stimulate a mass movement 6-7 times daily.

20. What is Hirshsprung's disease?

- A. A disease developed in adulthood.
- B. Loss of the intrinsic nervous plexus resulting in continuous contraction of circular muscle.
- C. Incompetence of internal or external anal sphincters.
- D. Inappropriate leakage of feces or flatus.
- E. A sensory malfunction where patients can't detect filling of the rectum.

21. Which of the following is NOT a component of saliva?

- A. Alpha-amylase and lingual lipase.
- B. Mucin and muramidase.
- C. Bicarbonate and magnesium.
- D. Protease and peptidase.
- E. Lactoferrin and ABO blood group substances

22. If you increase the rate of salivary secretion which of the following changes in ionic composition results?

- A. Sodium concentration increases.
- B. Bicarbonate concentration decreases.
- C. Chloride decreases.
- D. Potassium increases.
- E. Osmolarity decreases.

23. Which of the following salivary components continues to be active in the acidic environment of the stomach?

- A. Alpha-amylase
- B. Lingual lipase.

24. Which of the following best describes type of saliva produced when parasympathetic stimulation increases the rate of salivary secretion?

- A. Copious, protein-poor, electrolyte-rich.
- B. Scant, transient protein-rich (mucin), electrolyte poor.
- C. Scant, protein-poor, electrolyte-poor.
- D. Copious, protein-rich (mucin), electrolyte-rich.

25. Which pair is correct concerning secretory glands/cells in the stomach and their products?

- A. Cardiac glands -- hydrochloric acid and intrinsic factor.
- B. Parietal cells -- pepsinogen
- C. Chief cells -- mucus
- D. G cells -- protease
- E. D cells -- somatostatin.

26. Which of the following does NOT contribute to hydrochloric acid secretion in the stomach?

- A. A basolateral bicarbonate/chloride exchanger to maintain intracellular chloride ions also resulting in an "alkaline tide" in the bloodstream.
- B. Passive flow of chloride and potassium ions through apical channels.
- C. Hydrogen ions supplied by a basolateral hydrogen/sodium pump.
- D. Water passively follows acid into gut to maintain osmotic balance.
- E. The primary contributor to hydrochloric acid secretion is a hydrogen/potassium ATPase that pumps out hydrogen in exchange for extracellular potassium.

27. Which of the following does NOT regulate gastric acid secretion?

- A. Vagus nerve stimulation.
- B. Cholecystokinin.
- C. Histamine
- D. Gastrin
- E. Acetylcholine

28. Which of the following combinations will result in the most acid secretion through potentiation?

- A. Vagal input, histamine, gastrin
- B. Vagal input, histamine, secretin
- C. Histamine, gastrin, secretin.
- D. Gastrin, vagal input, secretin
- E. Gastrin, vagal input, cholecystokinin.

29. A condition that results in too much acid in the stomach could be attributed to which of the following?

- A. Lack of taste buds or damage to olfactory nerves.
- B. Defect resulting in release of too much secretin.
- C. Defective G cells.
- D. Defect in D cells in the antrum.
- E. Loss of elasticity of small intestine making distension more difficult.

30. If you follow the path that food normally takes through the digestive system, which of the following is in the correct order?

- A. Upper esophageal sphincter, epiglottis, lower esophageal sphincter, pyloric canal, duct of Santorini, duct of Wirsung.
- B. Pharynx, epiglottis, lower esophageal sphincter, pyloric canal, duct of Wirsung, duct of Santorini.
- C. Pharynx, epiglottis, lower esophageal sphincter, pyloric canal, duct of Santorini, duct of Wirsung.
- D. Pharynx, upper esophageal sphincter, pyloric canal, lower esophageal sphincter, duct of Wirsung, duct of Santorini.

31. Pancreatic secretions have many of the same ions that plasma does, only the concentrations and their rate of secretion are different. Which of the following is true?

- A. A higher rate of pancreatic secretion results in increased bicarbonate and sodium ion. Plasma has less bicarbonate and more sodium.
- B. A higher rate of pancreatic secretion results in increased bicarbonate and decreased chloride ion. Plasma has less bicarbonate and more chloride.
- C. A higher rate of pancreatic secretion increases its osmolarity and pH. Plasma has a lower osmolarity as pancreatic secretions.
- D. A higher rate of pancreatic secretion results in increased bicarbonate and potassium ion. Plasma has lower levels of both ions.

32. If duodenal mucosal release of CCK was not working properly, which phase of pancreatic secretion would be interfered with?

- A. Cephalic phase.
- B. Gastric phase.
- C. Intestinal phase.
- D. Duodenal phase.

33. Which of the following has little effect on pancreatic secretion or its components?

- A. Acetylcholine.
- B. Sympathetic stimulation.
- C. Secretin
- D. Cholecystokinin
- E. VIP

34. Which of the following is NOT a component of bile secretions?

- A. Stercobilin.
- B. Bile pigments
- C. Cholesterol
- D. Lecithin
- E. Bilirubin-glucuronide

35. Since bile acids are highly lipophilic, they would be rapidly absorbed through the small intestine wall before they could facilitate lipid digestion. Which of the following prevents that from happening?

- A. Addition of hydroxyl and carboxyl acid groups to steroid nucleus of cholesterol.
- B. Bile acids combine with phospholipids to become less easily absorbed.
- C. Bile acids are conjugated to glycine or taurine so they ionize readily.
- D. Cholesterol binds to the bile acids to keep them from being absorbed.

36. If a patient has inadequate bile secretion, which of the following could contribute to the condition?

- A. Excessive release of cholecystokinin
- B. Excessive release of motilin
- C. Excessive release of secretin
- D. Excessive steroid hormones.
- E. Excessive parasympathetic stimulation.

37. Components of the intestinal mucosa combine to increase the surface area to 600 times that of a cylinder. Which component makes the greatest contribution to increasing the surface area?

- A. The folds
- B. The villi
- C. The microvilli
- D. The cilia

38. Sodium ions play an important role in carbohydrate absorption. All of the following processes require it EXCEPT:

- A. Sugars leaving the intestinal cell to enter the portal blood system.
- B. Glucose absorption from gut lumen by second active transport.
- C. Process that brings potassium into the intestinal cell.
- D. Galactose absorption from the gut lumen.

39. Which of the following is NOT a polysaccharide?

- A. Dextrin
- B. Glycogen
- C. Sorbitol
- D. Amylose
- E. Amylopectin.

40. Choose the FALSE statement regarding dietary fiber?

- A. Examples are cellulose, hemicellulose, pectin, and gums.
- B. Insoluble in water, poorly digested, excreted in feces.
- C. Pectin is readily absorbed.
- D. Binds to bile acids and promotes their excretion.
- E. Reduces colon transit time and may reduce the production of carcinogenic secondary bile acids.

41. A deficiency of colipase would result in which of the following?

- A. Lipase would not be able to bind to the oil-water interface of the lipid.
- B. An inability to digest phospholipids.
- C. An inability to digest cholesterol.
- D. An inability to digest lipids in the stomach.

42. Which of the following pass through the thoracic duct before passing through the liver?

- A. Lecithin.
- B. Micelles
- C. VLDLs
- D. Chylomicrons.
- E. Small and medium chain fatty acids.

43. Theoretically, which of the following deficiencies would make pepsin's role of protein digestion in the stomach more crucial?

- A. Lipase deficiency.
- B. A defect in the amino acid intestinal transport mechanism.
- C. Enterokinase deficiency.
- D. Cholecystokinin deficiency.

44. Of the following water soluble vitamins, which one CANNOT be absorbed by passive diffusion if the concentration is high enough?

- A. Vitamin B1
- B. Niacin.
- C. Vitamin B12
- D. Biotin.

45. Defective parietal cells would result in malabsorption of which vitamin?

- A. Vitamin B1
- B. Vitamin B2
- C. Niacin
- D. Vitamin B12
- E. Folic acid.

46. Which of the following is absorbed primarily by passive diffusion powered by a concentration gradient?

- A. Sodium
- B. Potassium
- C. Calcium
- D. Zinc
- E. Iron.

47. Of the approximately 9 liters of water that go through the GI tract daily, how much makes it out in the feces?

- A. 100 ml
- B. 1000 ml
- C. 2000 ml
- D. 1500 ml
- E. 500 ml

ANSWER KEY

1-c	11-a	21-d	31-b	41-a
2-d	12-d	22-a	32-c	42-d
3-b	13-a	23-b	33-b	43-c
4-d	14-c	24-a	34-a	44-c
5-d	15-c	25-e	35-c	45-d
6-b	16-a	26-c	36-d	46-b
7-a	17-a	27-b	37-c	47-a
8-d	18-b	28-a	38-a	
9-d	19-e	29-d	39-c	
10-a	20-b	30-c	40-c	