

Friday, February 18th, 2022

Following directions on the mark-sense form, write your **name, and student number** in the blanks and fill in the bubbles. In addition, write your **name** on this exam.

When finished with the test, turn in both the mark-sense form and the exam at the front of the room.

KEY: CORRECT ANSWERS ARE IN RED

MULTIPLE CHOICE: Always choose the BEST, most complete answer. (2 points each)

1. Where is GALT (gut-associated lymphoid tissue) located?
 - a) in the lumen of the GI tract
 - b) between the circular and longitudinal muscle layers
 - c) in the mucosa**
 - d) in the submucosa
 - e) in the mesenteries
2. Which of the following is the pacemaker that determines the rate of peristaltic contractions in the stomach?
 - a) ICC cells (interstitial cells of Cajal) that generate slow waves**
 - b) nucleus in the brainstem that activates smooth muscle via parasympathetic input
 - c) ECL cells (enterochromaffin cells) that release histamine
 - d) myenteric plexus of the enteric nervous system
 - e) submucous plexus of the enteric nervous system
3. Which of the following is a factor that can convert pepsinogen to an active enzyme?
 - a) somatostatin
 - b) histamine
 - c) enteropeptidase
 - d) H⁺ in the duodenum
 - e) H⁺ in the stomach**
4. The cephalic phase of gastric acid secretion involves
 - a) parasympathetic preganglionic neurons activating enteric neurons.**
 - b) enteroendocrine cells in the duodenum.
 - c) buffering by food in the lumen of the stomach.
 - d) stretch of the stomach activating enteric neurons.
 - e) peptides activating enteroendocrine cells in the stomach.

5. *H. pylori* infection that causes gastritis (stomach inflammation) in the antrum results in acid hypersecretion and duodenal ulcer. The inflammation affects enteroendocrine cells, resulting in increased secretion of which of the following hormones?
- insulin
 - gastrin**
 - CCK
 - somatostatin
 - GLP-1
6. Use of nonsteroidal anti-inflammatory drugs (NSAIDs) reduces
- production of prostaglandins.
 - mucus secretion in the stomach.
 - acid secretion in the stomach.
 - BOTH prostaglandin production and mucus secretion in the stomach.**
 - BOTH prostaglandin production and acid secretion in the stomach.
7. Which of the following is an exocrine secretion by the pancreas?
- insulin
 - glucagon
 - bicarbonate (HCO_3^-)**
 - ALL of the above
 - NONE of the above
8. Which of the following allows for bile release during the digestive period?
- contraction of smooth muscle in the pyloric sphincter
 - relaxation of smooth muscle in the sphincter of Oddi**
 - gastric phase stimuli that also promote acid secretion
 - intrinsic factor
 - zymogen secretion by the pancreas
9. Fill in the blank. H^+ in the small intestine triggers release of the hormone _____, which stimulates secretion by duct cells in the liver and pancreas.
- secretin**
 - cholecystokinin
 - gastrin
 - histamine
 - GLP-1
10. The term “cystic fibrosis” was coined to describe the damage that occurs in which of the following digestive organs?
- colon
 - gallbladder
 - liver
 - stomach
 - pancreas**

11. Hepcidin is a hormone that regulates absorption of
- a) glucose.
 - b) amino acids.
 - c) iron.**
 - d) cholesterol.
 - e) antibodies.
12. What does bile contain that enables it to emulsify fats?
- a) amphipathic molecules**
 - b) bile pigments
 - c) cholesterol
 - d) lipase
 - e) colipase
13. What are micelles?
- a) lipoproteins that deliver cholesterol to cells
 - b) lipoproteins produced by enterocytes
 - c) large droplets where fat digestion occurs
 - d) tiny particles that deliver fat digestion products to the apical membrane of enterocytes**
 - e) proteins that serve as ID tags for lipoproteins
14. All of these absorbed substances travel first to the liver via the hepatic portal vein, EXCEPT
- a) glucose
 - b) fructose
 - c) fatty acids**
 - d) amino acids
 - e) water-soluble drugs
15. What kind of neuron innervates the skeletal muscle of the external anal sphincter?
- a) parasympathetic preganglionic neuron
 - b) sympathetic postganglionic neuron
 - c) afferent neuron
 - d) somatic motor neuron**
 - e) enteric neuron
16. Where are the neuroendocrine cell bodies of the hunger and satiety centers located?
- a) stomach
 - b) duodenum
 - c) hypothalamus**
 - d) adipose tissue
 - e) muscles

17. Which of these constitutes an “anabolic” reaction?
- a) conversion of protein to glucose
 - b) conversion of glucose to glycogen**
 - c) conversion of triacylglycerol to free fatty acids
 - d) conversion of glycogen to glucose
 - e) oxidation of free fatty acids to acetyl-CoA
18. What metabolic output is measured in indirect calorimetry?
- a) oxygen (O₂)
 - b) feces
 - c) carbon dioxide (CO₂)**
 - d) urine
 - e) heat
19. Which of the following hormones negatively controls food intake?
- a) agouti-related peptide (AgRP)
 - b) ghrelin
 - c) neuropeptide Y (NPY)
 - d) leptin**
 - e) orexin
20. Measurement of the respiratory quotient (RQ) is useful for
- a) measuring plasma blood sugar.
 - b) predicting a patient’s likelihood to develop diabetes.
 - c) estimating glucagon secretion.
 - d) estimating a patient’s basal metabolic rate (BMR).**
 - e) measuring insulin secretion.
21. Which of the following is the principal hormone controlling “fed state” metabolism?
- a) insulin**
 - b) ghrelin
 - c) glucagon
 - d) orexin
 - e) neuropeptide Y (NPY)
22. Which of the following best describes the metabolic fate of glucose?
- a) can be oxidized for energy in the citric acid cycle
 - b) can be stored as glycogen
 - c) can be converted to fat and stored
 - d) ALL of the above represent possible metabolic fates of glucose**
 - e) NONE of the above represent possible metabolic fates of glucose

23. Which hormone is secreted by the alpha cells of the pancreatic islets of Langerhans?
- a) insulin
 - b) glucagon**
 - c) somatostatin
 - d) amylin
 - e) ghrelin
24. Insertion of glucose transporters (GLUT4) into skeletal muscle cell membranes occurs in response to hormones and what else?
- a) sleep
 - b) anxiety
 - c) alcohol
 - d) exercise**
 - e) pregnancy
25. The measurement of plasma glucose level once before and then after a sweet drink of glucose is called what?
- a) fasting plasma glucose test
 - b) Fehling's test
 - c) glomerular filtration rate
 - d) Kraft insulin assay
 - e) oral glucose tolerance test**
26. Which of the following is NOT a principal characteristic of Type 1 diabetes?
- a) no insulin is produced
 - b) it is more prevalent than Type 2 diabetes**
 - c) it is caused by an autoimmune reaction
 - d) it can lead to kidney failure and blindness
 - e) diabetic ketoacidosis is a greater risk than for Type 2 diabetes
27. Which of the following is NEVER a recommended treatment for Type 2 diabetes?
- a) bed rest**
 - b) insulin
 - c) weight loss
 - d) drug that promotes glucose excretion by the kidney
 - e) drug that delays carbohydrate breakdown

28. Which of the following is NOT a characteristic of ALL hormones?
- a) They act at low concentrations.
 - b) They bind to receptors to elicit a cellular response.
 - c) The same hormone may elicit a different response in different tissues.
 - d) They are eliminated from the bloodstream within seconds.**
 - e) Their action must be terminated in some manner.
29. Most (although not all) anterior pituitary hormones are secreted into the circulation in response to what signal?
- a) thirst
 - b) hypothalamic releasing hormones**
 - c) posterior pituitary neurohormones
 - d) blood glucose levels
 - e) somatostatin
30. Most hormones have their secretion terminated by
- a) cold temperatures.
 - b) positive feedback loops.
 - c) sleep.
 - d) negative feedback loops.**
 - e) proper diet and exercise.

END OF TEST

Turn in your mark-sense form
and your question sheets
at the front of the room.