

Biology 351 - Human Anatomy

Abdominal and Pelvic Cavities

Please place your name and I.D. number on the back of the last page of this exam. You must answer *all* questions on this exam. Because statistics demonstrate that, on average, between 2-5 questions on every 100-point exam are ambiguous enough to come out "aberrant" on an item analysis, the total number of points possible on this exam is 106. However, grades will be calculated out of a possible 100 points.

Section 1: Multiple Uglies. In the following questions a series of statements are printed under a general heading. Circle the letter in front of any and all correct statements. (1 point each) Keep in mind that some, all or none of the statements may be correct. Each total question is worth the number of points indicated.

1. General structure of hollow organs of the gastrointestinal (G.I. or digestive) tract (4 points)
 - a. In the hollow gastrointestinal organs the innermost layer is the mucosal layer. This layer is composed of epithelium and connective tissue, and is specialized for absorption and secretion.
 - b. The muscularis layer of hollow G.I. tract organs is actually composed of two sub layers: an inner longitudinal layer of smooth muscle and an outer layer of circularly arranged smooth muscle.
 - c. All hollow organs of the G.I. tract follow the same basic organization, in that all hollow organs have the same basic number and arrangement of layers.
 - d. The mucosal layer of the hollow G.I. tract organs is specialized in that it is the only epithelial layer that is vascularized (i.e. has blood vessels).

2. Structure of the large and small intestines (10 points)
 - a. The duodenum is in contact with the head of the pancreas.
 - b. Both the jejunum and ileum are intraperitoneal
 - c. The small intestine is specialized for absorption. Of these specializations (plica circularis, villi and microvilli) all but one (plica circularis) are specializations of the mucosal layer.
 - d. The junction between the ileum and cecum is marked by a valve, the ileocecal valve. This valve is responsible for preventing food passing from the small intestine to the large intestine at inappropriate times.
 - e. The large intestine has a significantly different function than that of the small intestine, and therefore lacks the specializations for absorption seen in the small intestine. However, the large intestine (colon) possesses several distinct specializations of its own: haustra and teniae coli.
 - f. The cecum is intraperitoneal.
 - g. The ascending colon is secondarily retroperitoneal.
 - h. The transverse colon is initially intraperitoneal, and then becomes retroperitoneal.
 - i. The duodenum is the first portion of the small intestine. The first segment of the duodenum is retroperitoneal and then becomes intraperitoneal.
 - j. The descending colon is retroperitoneal.

3. The peritoneum (6 points)

- a. The basic arrangement of the peritoneum follows that of the pleural membranes discussed in conjunction with the thoracic cavity.
- b. The visceral layer of the peritoneum is attached to the surface of many of the organs of the abdominal cavity.
- c. The parietal layer of the peritoneum lines the wall of the abdominal cavity.
- d. If an organ is intraperitoneal, it is covered on all sides by the peritoneum.
- e. If an organ is retroperitoneal, it is covered only on the anterior surface by the peritoneum.
- f. If an organ is secondarily retroperitoneal, the organ had a relationship with the peritoneum at one time during development, but lost it.

Section 2: True-False Questions dealing with the muscles of the abdominal and pelvic cavities. If the following statements about the abdominal musculature are true place a (+) in the space provided; if the statement is false place a (O) in the space. 2 points each.

- _____ 4. The internal oblique originates on the iliac crest and inguinal ligament, and inserts onto the ribs, costal cartilages, linea alba and pubic crest.
- _____ 5. The rectus abdominis flexes the trunk.
- _____ 6. The transverse abdominis muscle is the innermost and thinnest of the abdominal muscles. Its fibers run transversely, and may be absent in a large number of individuals.
- _____ 7. The external oblique originates on the iliac crest and inguinal ligament, and inserts onto the ribs, costal cartilages, linea alba and pubic crest.
- _____ 8. The rectus abdominis muscle is a long strap-like muscle extending the length of the anterior abdominal wall on each side of the linea alba.

Section 3: Organs of the pelvic cavity. If the following statements are true place a (+) in the space provided. If the statement is false place a (O) in the space provided. (2 points each for a total of 10 points)

- _____ 9. The clitoris is the female erectile organ. It contains two corpora spongiosa, similar to the male erectile organ.
- _____ 10. The voluntary sphincter of the male urethra would be found within the membranous urethra.
- _____ 11. The male urethra is subdivided into three segments. The portion within the center of the male penis is termed corpus spongiosum, and this contains the penile (cavernous) urethra.
- _____ 12. Each uterine tube lies in the upper part of the broad ligament, which serves to help hold the uterine tube (and the uterus) in place.

- _____ 13. The round ligament of the female anchors the uterus to the external body wall after passing through the inguinal canal.

Section 4: If the following statements about the vasculature of the abdominal and pelvic cavities are true place a (+) in the space provided; if the statement is false place a (O) in the space provided.

- _____ 14. The celiac trunk is the first vessel to branch off of the abdominal aorta.
- _____ 15. The splenic artery supplies the stomach (along the lesser curvature), pancreas, ileum and duodenum with blood.
- _____ 16. The stomach, small intestine, large intestine, pancreas and gall bladder drain into the inferior vena cava via the hepatic portal vein.
- _____ 17. The hepatic portal vein is formed by the union of the inferior mesenteric and splenic veins. The third vessel that participates in the formation of the hepatic portal vein is the superior mesenteric vein. This vessel will join either the splenic vein or the inferior mesenteric vein.
- _____ 18. The celiac trunk subdivides into the common hepatic artery, splenic artery and right gastric artery.
- _____ 19. The abdominal aorta would be found to lie to the left of the vertebral column within the abdominal cavity.
- _____ 20. The hepatic artery supplies the liver, gallbladder, stomach (along the greater curvature) and duodenum with blood.
- _____ 21. The inferior vena cava would be found to lie superficially and to the right of the abdominal aorta within the abdominal cavity.
- _____ 22. The abdominal aorta ends by the bifurcation into the common iliac arteries.
- _____ 23. The inferior mesenteric artery branches off of the abdominal aorta superior to the formation of the common iliac arteries. The inferior mesenteric artery supplies the cecum, appendix, ascending colon, transverse colon, descending colon and sigmoid colon with blood.
- _____ 24. The renal arteries and suprarenal arteries supply the kidneys and suprarenal glands (adrenal glands) with blood, respectively.
- _____ 25. The third artery that branches off of the celiac trunk (right gastric artery) supplies the cardia of the stomach and the adjacent portion of the esophagus with blood.
- _____ 26. The superior mesenteric artery branches off of the abdominal aorta inferiorly to the celiac trunk. This vessel supplies the following areas of the G.I. tract with blood: duodenum, jejunum, cecum, ascending colon, appendix, ileum and the first 2/3 of the transverse colon.

_____ 27. No organ of the gastrointestinal tract drains into the inferior vena cava directly.

Section 5: Organs of the abdominal cavity. Multiple choice. Place the most appropriate letter in the space provided. (2 points each)

- _____ 28. Haustra and teniae coli would be found in association with which of the following structures?
- a) stomach
 - b) colon (large intestine)
 - c) small intestine
 - d) gall bladder
 - e) appendix
- _____ 29. An organ that has a dual relationship with the peritoneum (starting out intraperitoneal and then becoming secondarily retroperitoneal) and also has a close relationship with the head of the pancreas best describes which of the following organs?
- a) stomach
 - b) duodenum
 - c) ileum
 - d) jejunum
 - e) transverse colon
- _____ 30. Which of the following structures possesses villi, plica circularis, and microvilli?
- a) stomach
 - b) colon (large intestine)
 - c) small intestine
 - d) gall bladder
 - e) appendix
- _____ 31. Which of the following structures would be found entirely within the left hypochondrium of the abdominal cavity?
- a) stomach
 - b) liver
 - c) spleen
 - d) transverse colon
 - e) ileum
 - f) jejunum

_____ 32. The stomach has numerous structures that are responsible for digestion and absorption. Which of the following structures enable the mucosa of the stomach to expand as the stomach fills?

- a) parietal cells;
- b) chief cells;
- c) mucous cells;
- d) pepsinogen;
- e) HCl (hydrochloric acid);
- f) rugae;
- g) haustra;
- h) incisura angularis;

Section 6: Answer the following questions in the space provided. (2 points each)

33. Give the anatomical name of the artery that supplies the rectum and the anal canal with blood.

34. Give the anatomical name of the artery that supplies the spleen, stomach (along the greater curvature) and pancreas

35. Give the anatomical name of the artery that *directly supplies* the liver, gallbladder and stomach (along the lesser curvature) with blood.

36. Give the anatomical name of the artery that supplies the following organs with blood: duodenum, ileum, jejunum, first 2/3 of the large intestine (including cecum, appendix, ascending colon and first 2/3 of the transverse colon).

37. Give the anatomical name of the piece of connective tissue that attaches the lateral walls of the uterus to the muscular wall of the pelvic cavity.
38. Give the anatomical name of the piece of connective tissue that attaches the uterus to the external body wall after passing through the inguinal canal.
39. Give the anatomical name of the piece of connective tissue that helps support the uterine tubes. This piece of connective tissue is also one of the ligaments of the uterus

Section 7: Terminology. Define the following terms in the space provided. (2 points each).

40. parietal

41. visceral

42. cecum

43. cortex

44. infundibulum

45. medulla

46. rectus