Day 4 Digestive System:

Part 1 - Larynx, trachea (respiratory), esophagus

Approach the larynx from the ventral surface of the neck. Gently cut through the muscles until you can see the cartilage of the larynx. Clear away the muscle from the larynx and trachea. Now push the trachea aside and locate the flattened esophagus that runs directly behind it.

Analysis Questions-Digestive System

Log into QUIA using your Team’s Username and Password provided by your instructor. As your group works on the DAY 4 assignment of the cat dissection, enter your responses to the Analysis Questions into QUIA - Day 4. Your team may save your work from class and return to finish the assignment until the due date (see assignment sheet). When the section is complete, select “submit” to send your Analysis Question responses to your instructor. The reference diagrams in this eBook are also available online so that you can zoom in and out.

Question 20
Describe the functions of the trachea and esophagus. How does the structure of each aid in its function?
1. Observe the raised papillae on the surface of the tongue. Taste buds are located on the papillae. Note the spiny filiform papillae in the front and middle of the tongue. These function as combs when the cat grooms when the cat grooms itself by licking its fur. Cats have more filiform papillae than humans. Lift the tongue, and identify the inferior lingual frenulum, which is the structure that attaches the tongue to the floor of the oral cavity.

2. Observe if any teeth are missing or damaged.

3. At the posterior of the oral cavity, locate the pharynx. Recall that these regions are the nasopharynx dorsal to the soft palate, the oropharynx posterior to the oral cavity, and the laryngopharynx around the epiglottis and the opening to the esophagus.

4. Unless already done in a previous dissection exercise, remove the skin from one side of the head. Carefully remove the connective between the jaw and the ear. Observe the small, dark, kidney-bean shaped lymph nodes and the oatmeal-colored, textured salivary glands. Locate the large parotid gland inferior to the ear on the surface of the masseter muscle. The parotid duct passes over this muscle and enters the oral cavity. The submandibular gland is inferior to the parotid gland. The sublingual gland is anterior to the submandibular gland. Ducts of both glands open onto the floor of the mouth, but typically only the submandibular duct can be traced.

5. Return to the pharynx and identify the opening into the esophagus posterior to the epiglottis of the larynx. The esophagus connects the laryngopharynx to the stomach. Reflect the organs of the thoracic cavity and trace the esophagus through the diaphragm into the abdominal cavity, where it connects with the stomach.
Opening the Ventral Body Cavity
1. Place the animal on the dissecting tray ventral side up. Using scissors, make a *longitudinal median incision* through the ventral body wall. Begin your cut just superior to the midline of the pubic bone and continue it anteriorly to the rib cage. Check the incision guide provided above.

2. Angle the scissors slightly to the right or left of the sternum, and continue the cut through the rib cartilages, just lateral to the body midline, to the base of the throat.

3. Make two *lateral cuts* on both sides of the ventral body surface, anterior and posterior to the diaphragm, which separates the thoracic and abdominal parts of the ventral body cavity. Leave the diaphragm intact. Spread the thoracic walls laterally to expose the thoracic organs.
4. Make an angled *lateral cut* on each side of the median incision line just superior to the pubic bone, and spread the flaps to expose the abdominal cavity organs.

**Dissection of the Digestive System of the Cat**

Obtain your cat and tray, place it dorsal surface down. Obtain all necessary dissecting instruments. If you have completed the dissection of the circulatory and respiratory systems, the abdominal cavity is already exposed and many of the digestive system structures have been previously identified. However, duplication of effort generally provides a good learning experience, so all of the digestive system structures will be traced and identified in this exercise.

If the abdominal cavity has not been previously opened, make a midline incision from the rib cage to the pubic symphysis as shown in previous diagram. Then make four lateral cuts – two parallel to the rib cage and two at the inferior margin of the abdominal cavity so that the abdominal wall can be reflected back while you examine the abdominal contents. Observe the shiny membrane lining the inner surface of the abdominal wall, which is the *parietal peritoneum*.

**Identify Alimentary Canal Organs**

1. Using the reference diagram, locate the abdominal alimentary canal structures.
2. Identify the large reddish brown liver just beneath the diaphragm and the greater omentum covering the abdominal contents. The greater omentum assists in regulating body temperature and its phagocytic cells help to protect the body. Notice that the greater omentum is riddled with fat deposits. Lift the greater omentum, noting its two-layered structure and attachments, and lay it to the side or remove it (ask your instructor) to make subsequent organ identifications easier. Does the liver of the cat have the same number of lobes as the human liver?

3. Lift the liver and examine its inferior surface to locate the gallbladder, a dark greenish sac embedded in the liver’s ventral surface. Identify the falciform ligament, a delicate layer of mesentery separating the main lobes of the liver (right and left median lobes) and attaching the liver superiorly to the abdominal wall. Also identify the thickened area along the posterior edge of the falciform ligament, the round ligament, or ligamentum teres, a remnant of the umbilical vein of the embryo.

4. Displace the left lobes of the liver to expose the stomach. Identify the cardiac, fundic, body, and pyloric regions of the stomach. What is the general shape of the stomach?

5. Locate the lesser omentum, the serous membrane attaching the lesser curvature of the stomach to the liver. Make an incision through the stomach wall to expose the inner
surface of the stomach. Can you see the **rugae**? (When the stomach is empty, its mucosa is thrown into large folds called rugae. As the stomach fills, the rugae gradually disappear and are no longer visible.)

6. Lift the stomach and locate the **pancreas**, which appears as a grayish or brownish diffuse glandular mass in the mesentery. It extends from the vicinity of the spleen and greater curvature of the stomach and wraps around the duodenum. Attempt to find the pancreatic duct as it empties into duodenum at a swollen area referred to as the hepatopancreatic ampulla. Close to the pancreatic duct, locate the bile duct and trace its course superiorly to the point where it diverges into the cystic duct (gallbladder duct) and the common hepatic duct (duct from the liver). Notice that the duodenum assumes a looped position.
The Abdominal Cavity, Stomach, and Spleen

The stomach has four major regions; the **cardia**, at the entrance of the esophagus; the **fundus**, which is the dome-shaped pouch that rises above the esophagus; the **body**, the main portion of the stomach; and the **phylorus**, the posterior region of the stomach. The phylorus ends at the pyloric sphincter, the location where the digestive tube continues as the duodenum. The lateral margin of the stomach is convex and is called the greater curvature. The medial margin is concave and is called the lesser curvature.

The abdominal organs are protected by a fatty extension of the peritoneum from the greater curvature of the stomach called the greater omentum. The lesser omentum is a peritoneal sheet of tissue on the lesser curvature that suspends the stomach from the liver.

**Procedures:**
1. Reflect the **greater omentum** to expose the abdominal organs. Note the attachment of the greater omentum to the stomach and the dorsal wall. Remove the greater omentum and discard the fatty tissue in the biohazard bag, or as indicated by your instructor.
2. Locate the **stomach** and identify its four regions and the greater and lesser curvatures.
3. Make an incision through the stomach wall; run your scalp along the greater curvature and continue about 5 cm beyond the pylorus and into the duodenum. Open the stomach and observe the pyloric sphincter. Large folds of the stomach mucosa, called rugae, are visible in the empty stomach.

4. Posterior to the stomach, in the abdominal cavity, observe a large, dark-brown organ, which is the spleen.

**Small and Large Intestines:**
The small intestine has three regions. The first 15 cm is the C-shaped duodenum. It receives chyme from the stomach and secretions from the gallbladder, liver and pancreas. The jejunum comprises the bulk of the remaining length of the small intestine. The ileum is the last region of the small intestine and joins with the large intestine.

The large intestine is also divided into three regions. The first, following the terminus of the small intestine, is the cecum, which is wider than the rest of the large intestine and noticeably pouch-shaped. At this location is one difference between feline and human digestive tracts: in humans, the appendix is attached to the cecum, but cats have no appendix. The greatest portion of the large intestine is the colon, which runs upward from the cecum (ascending), across the abdominal cavity (transverse), and then downward (descending). The colon terminates in the third region of the large intestine, the rectum.

The intestines are surrounded by the peritoneum. Sheets of peritoneum, called mesentery, extend between the loops of intestines. The mesocolon is the mesentery of the large intestine.

**Procedures:**
1. Identify the three portions of the small intestine: the duodenum, the jejunum, and the ileum. Rub your fingers around the ileum at the point where it joins the large intestine to feel the ileocecal sphincter, the valve that controls the flow of chyme from the ileum into the cecum.
2. Extend the cut at the pylorus to several centimeters along the duodenum. Reflect the cut segment of the small intestine and secure it open with dissecting pins. Use a hand lens to observe numerous villi, the duodenal ampulla, and the opening of the duct.
3. To view the large intestine, pull the loops of small intestine to the cat’s left and let them drape out of the body cavity.
4. Take note of the three parts of the colon. The ascending colon lies on the right side of the abdominal cavity and begins just superior to the cecum. The transverse colon extends across the abdominal cavity, and the descending colon runs on the left side of the posterior abdominal wall.
5. Next locate the rectum, which ends at the anus.
6. Examine the peritoneum that supports all three regions of the colon and attaches them to the posterior body wall. Here the peritoneum is called the .

**The Liver, Gallbladder, and Pancreas:**
The liver is the largest organ in the abdominal cavity and is located posterior to the diaphragm. The liver is divided into five lobes: right and left medial, right and left lateral,
and caudate (posterior). The liver in humans has only four lobes: right, left, caudate and quadrate. The falciform ligament is a delicate membrane that attaches the liver superiorly to the diaphragm and abdominal wall. The gallbladder is a dark-green sac within a fossa in the right medial liver lobe. The liver produces bile, a substance that emulsifies lipid into small drops for digestion. The common hepatic duct transports bile from the liver. The cystic duct from the gallbladder emerges with the common hepatic duct as the common bile duct, which empties bile into the duodenum.

Posterior to the stomach and within the curvature of the duodenum lies the pancreas, the major glandular organ of the digestive system. In the cat, the pancreas has two regions, head and tail. The region that wraps around the duodenum is the head, and the portion that passes along the posterior surface of the stomach is the tail. In humans the pancreas has a broad middle portion called the body. The pancreatic duct (duct of Wirsung) transports pancreatic juice, which is rich in enzymes and buffers, to the duodenum. The common bile duct and the pancreatic duct join in the intestinal wall at the duodenal ampulla. Bile and pancreatic juice enter the duodenum from the ampulla.

**Procedures:**

1. Observe the large, brown liver posterior to the diaphragm and distinguish between the five lobes: right and left medial, right and left lateral, and caudate. Identify the gallbladder and the falciform ligament.
2. Tease the connective tissue away from the common hepatic duct, cystic duct, and common bile duct. Trace the common bile duct to its terminus at the duodenal wall.

Examine the head and tail of the pancreas. Expose the pancreatic duct and ampulla by using a probe to scrape away the pancreatic tissue of the head portion. Trace the duct to the ampulla. The pancreatic and common bile ducts are adjacent to each other.
Question 21
Note the large, folded membrane (greater omentum) that covers the internal organs. Describe its appearance and possible functions.

Question 22
Carefully remove the greater omentum to expose the underlying organs. Use the diagrams to locate the following digestive structures and describe their functions.

a. stomach

b. small intestine

c. large intestine (colon)

d. cecum
e. liver

f. gall bladder

g. pancreas

h. spleen

i. rectum

**Question 23**
Describe the appearance of the small intestine. How is its structured related to its function?

**Question 24**
Where is the gall bladder located? How is this location well suited to its function?
Question 25

A. _______________
B. _______________
C. _______________
D. _______________
E. _______________
F. _______________
G. _______________
H. _______________
I. _______________
J. _______________