Example of essay on digestive system

Health & Medicine, Body

Exercise 1

- The columnar epithelium from the stomach resembles the columnar epithelium from the duodenum in many aspects. The columnar nature of the epithelium in both instances serves for increased protection of the underlying organs and organelles. The simple columnar epithelia found in the stomach and duodenum also contains the largest cytoplasmic volumes in comparison to all the other epithelia, housing organelle density and energy reserves suitable in the engagement of the most complex of secretory and absorption functions. The duodenum epithelia however, posses an extra microvillus which aids in increasing the surface area for absorption. The epithelia in the stomach posses in their midst, mucus secreting goblets aiding in the smooth movement of substances along the stomach wall (McClure et. al, 1998).

- Salivary glands have various structural modifications that enable them conduct their function effectively. They include the concentration of a large number of secretory cells in the same organ, thus enhancing the secretion of saliva and mucus in large volumes. Further, the positioning of the various glands within the oral cavity makes them suitable in the execution of the various functions they are meant.

- Kupfer cells are found in the liver and are useful in the breaking down of the hemoglobin molecule freeing up the globin chains and the iron molecules for re-use in making of red blood cells.

- The major difference between the duodenum and the ileum is that the ileum is much longer than the duodenum. While the duodenum is 25-38 cms long, the ileum is between 2-4 meters in length. Further, all the ducts, from

the liver, pancreas and other glands draining into the small intestine are in duodenum with the ileum containing none.

- The alimentary canal is the digestive tract/ gastrointestinal tract through which food passes from the mouth, starting digestion to the anus where it is excreted.

Exercise 2

- -All the three salivary glands are structurally compound exocrine glands. This means that they have a duct system that takes secretions from the productive regions to wherever they are destined to be used.

- -The soft plate is located at the back of the roof of the mouth and closes the nasal passages during swallowing. On the other hand, the hard palate is situated at the front of the roof of the mouth close to the front teeth. Moreover, the hard plate is made of bone whereas the soft plate is made of muscles. The hard palate holds the roots of the upper teeth and supports the alveolar ridge, an important part of clear articulation. It also helps in tongue-palate articulation. The soft palate is essential in swallowing and gagging as the series of muscles making it up allow it to press down and to raise creating space for yawning and bright open sounds. The muscles also clear the auditory tubes, which creates the ear-popping familiar when flying on plane (Ivy et. al, 1999).

- -The reason the liver in the fetal pig is so large is that it produces all of the fetal blood in the fetus including white and red blood cells.

- -Rugae can be found in various locations, in a human. These are; gallbladder, inside the stomach, inside the urinary bladder, wrinkles of the scrotum, vagina, and on the hard palate immediately after the upper anterior

teeth. Rugae allow the stomach or other tissues within the human body to expand when needed.

- -The ileoceval valve is situated at the junction of the small intestine and the large intestine.

- -The end of the ileum entering the large intestines has a short blind sac about two cm long. At this juncture, one can tell when he/she has transitioned from the small intestine to the large intestine in the fetal pig.

- -Enzymes produced by the pancreas are secreted into the lumen of the acinus, held in the intralobular ducts that drain to the major pancreatic duct, which subsequently drains directly into the duodenum.

- -Apart from the digestive system, the pancreas also belongs to the endocrine system (Ivy et. al, 1999).

Exercise 3: Overview of Human Digestive Organs

- The stomach is pouch like organ placed in the abdomen of both the human and fetal pig body. The stomach is continuous with the esophagus, similar in the fetal pig, and is divided into three sections: fundus, body and the antrum. The stomach is structurally adapted to its function by the presence glands that produce juices containing enzymes in aid of food digestion. Bile juice, for instance, contains hydrochloric acid which acts to kill pathogens that might be present in food. Further, the mucus secreted by the stomach walls coats the food in prevention of accidental injury to the delicate stomach walls, and corrosion by the gastric juice.

- The intestines are specialized to fulfill various digestive functions as along the digestive tract. They are thus classified as large and small intestines, with the small intestines being useful in the absorption of nutrients. In

conduct of this function, they are long, and have numerous villas in their surface which increases surface area for absorption. The colon in humans is straightened while that of the fetal pig is spiral, marking the major difference between the two.

- The pancreas is both an endocrine and an exocrine gland. It adapts to the dual function it holds in the body by being strategically placed between above the duodenum, in that it supplies it with pancreatic juice used in digestion, and centrally placed near the heart to receive supply from both the celiac axis as well as the superior mesenteric artery to supply insulin to the blood. The pancreas in the human body resembles the one in the fetal pig, showing similarities in vertebral mammals in their digestion.
- The tooth is made up of two anatomical parts, the crown and the root. The enamel is the hard outer pat, modified for the function of crushing food into digestible molecules. Other parts below the enamel are the dentine, the pulp, the cementum, (Which helps hold the tooth in place during chewing) and the gums. Other adaptations for the tooth include the periodontal ligament, which anchors the tooth to the bony socket and act as shock absorbers for the tooth (Ivy et. al, 1999).

Exercise 4

- This is the chemical breakdown of chemical bonds through the addition of a water molecule.
- BAPNA is used to test for the presence of Trpsin. BAPNA is a synthetic dye shares a covalent bond with an amino acid. The dye is colorless but turns colorless upon hydrolysis. A positive hydrolysis reaction would lead to a yellowish color confirming the break of the covalent bond between BAPNA

and an amino acid.

- Enzymatic activity is affected by temperature. At very high temperature enzymes get denatured and at very low temperatures enzymes become deactivated. Room temperature is relatively low and reduces enzymatic action. On the other hand, at body temperature enzymatic action is optimal.
- Tubes in each experiment were controlled to give the expected results for the purpose of comparison.
- The salivary amylase moistens crackers or dry foods to enable chewing and prevent damage of the throat while swallowing.
- Trypsin digests proteins through the cleavage of peptide chains at particular sites. It breaks peptide chains after Arginine or Lysine amino acids leaving the proteins as a chain of peptides without amino acids such as Lysine and Arginine.
- Digestion of fats takes place in two steps, that is, emulsification and lipid digestion. During emulsification fat molecules are broken down into tiny particles by bile. This increases surface area for digestion of lipids by pancreatic lipase into fatty acids which are absorbable by the walls of the small intestines (McClure et. al, 1998).

Conclusion

Acid reflux

This is a condition occasioned by the backward flow acid from the stomach into the esophagus. During an occasion of acid reflux, a patient may taste sour/ regurgitated food at the back of their mouth, or experience a burning sensation in their chest/ heartburn.

Treatment

Acid reflux may be treated, if necessary, with over the counter medications such as antacids, H-2 receptor blockers and proton pump inhibitors. In case of elevated acid reflux, known as GERD, prescription medicines by a doctor may help. Acid reflux may be alleviated by avoiding foods known to trigger it, such as peppermint, for instance. Changes in lifestyle, such as reduction on smoking and alcohol intake have also been known to help, as well as taking smaller meals.

Peptic ulcer

These are painful sores/ ulcers in the duodenum or in the stomach lining. There is no singular known cause for these ulcers, however, the imbalance in digestive fluids in the stomach and the stomach have emerged to naturally lead into ulcers. A patient suffering from ulcers may experience any of the following symptoms;

- A burning pain in the middle or upper stomach between meals or at night
- Bloating
- Heartburn
- Nausea and/ vomiting

In severe cases of peptic ulcers, the patients may exhibit;

- Dark stool caused by bleeding
- Vomiting blood
- Loss of weight
- Severe pain in middle to upper abdomen

Diagnosis and treatment

The diagnosis is done majorly by the symptomatic pain associate with ulcers in the abdominal area. When treatment are done using such diagnosis without reprieve for the patient, then an endoscopy, barium contrast x-rays and in case bacterial infection (helicobacteria pylori) diagnosis may be made by;

- Urea breath tests
- Direct culture from a biopsy specimen
- Rapid urease test to determine urease activity
- Stool antigen test

Treatment of peptic ulcers is by;

- Use of antibiotic remedy to kill the H. pylori.
- Use of medication that blocks the production of excess acid
- Antacids that neutralize stomach acid
- Medication that protects the lining of the stomach and intestine

Diverticulitis

This is a digestive disease involving the formation of pouches known as (diverticula) within the walls of the bowel. This condition is mostly observed to afflict the large intestines, although the small intestines may be infected occasionally. A patient suffering from diverticulitis exhibits abdominal pain as the prevalent symptom, while they may also show symptoms such as tenderness around the left side of the abdomen. If the condition is caused by an infection, then a patient may experience nausea, vomiting, cramping, constipation and fever.

Diagnosis

The disease is diagnosed with the use of a computed tomography, or a CT scan.

Treatment

In cases of simple infection, diverticulitis is treated by the use of conservative therapy and bowel rests. If bacteria are suspected to be the cause of diverticulitis, the use of antibiotics has been found effective in their cure. Complications such as peritonitis, abscess, or fistula may require surgical intervention.

References

Ivy, A. C., & Gray, J. S. (1999). The digestive system. Annual Review of Physiology, 1(1), 235-268.

McClure, H. M., Chapman Jr, W. L., Hooper, B. E., Smith, F. G., & Fletcher, O. J. (1998). The digestive system. In Pathology of laboratory animals (pp. 175-317). Springer New York.