CHAPTER NO.1 DIGESTIVE SYSTEM OF A MAN

(Review Exercise)

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Short Question And Answers

What is mechanical digestion?

Mechanical digestion is the physical process of breaking down food into smaller pieces without changing its chemical structure. It begins in the mouth with chewing and continues in the stomach through churning. This increases the surface area for enzymes to work. It helps prepare food for chemical digestion.

What is chemical digestion?

Chemical digestion involves breaking down large food molecules into smaller ones using enzymes and acids. It begins in the mouth with saliva and continues in the stomach and small intestine. Enzymes break proteins, fats, and carbohydrates into their building blocks. This process makes nutrients absorbable by the body.

Describe peristalsis.

Peristalsis is a series of wave-like muscle contractions that move food through the digestive tract. It starts from the esophagus and continues through the intestines. These movements are involuntary and help mix and push the food forward. It plays a key role in digestion and absorption.

Name and write the function of epithelial cells of stomach of man.

The epithelial cells of the stomach secrete mucus, digestive enzymes, and hydrochloric acid. Mucus protects the stomach lining from acid. Some epithelial cells also help in absorbing nutrients and water. These cells form a barrier and support stomach function.

Give one reason as to why some enzymes in stomach and intestine are secreted in inactive form.

Some enzymes are secreted in an inactive form to prevent them from digesting the tissues of the organ that produces them. For example, pepsin is secreted as pepsinogen and activated only in acidic pH. This protects the stomach lining from being digested by the enzyme itself.

Name the enzymes involved in protein digestion.

Protein digestion involves enzymes like pepsin (in the stomach), trypsin and chymotrypsin (from the pancreas), and peptidases (in the small intestine). These enzymes break down proteins into peptides and then into amino acids. Each works in different parts of the digestive tract.

How could no secretion of HCl in our stomach affect food digestion?

Without HCl, pepsinogen will not convert to pepsin, leading to poor protein digestion. HCl also kills harmful microbes in food. It creates the acidic environment needed for enzymes to function properly. So, digestion becomes slow and less effective.

How does the stomach protect itself from the damaging effect of HCl?

The stomach has special epithelial cells that secrete a thick mucus layer. This mucus forms a protective barrier between the stomach lining and acidic gastric juices. Additionally, bicarbonate ions neutralize acid near the lining. This prevents ulcers and damage.

Why are there villi in the intestine and not in stomach?

Villi are tiny finger-like projections that increase the surface area for absorption in the small intestine. The stomach's main role is digestion, not absorption, so it doesn't need villi. Villi help in the efficient absorption of nutrients into the bloodstream.

Trypsin acts at alkaline pH. What provides the alkalinity?

The alkalinity needed for trypsin action is provided by bile from the liver and bicarbonate ions from pancreatic juice. These neutralize the acidic chyme coming from the stomach. This creates a suitable pH for trypsin and other intestinal enzymes to work

What would happen to the activity of the intestinal enzymes if the pH in the small intestine remained at 2?

If the pH stayed at 2 (highly acidic), the enzymes in the small intestine would become inactive or denatured. They require a neutral to slightly alkaline pH to function. Digestion and absorption of nutrients would be greatly affected and inefficient

How does the absorption of fat differ from absorption of glucose?

Glucose is absorbed directly into the blood capillaries in the small intestine. Fat is broken into fatty acids and glycerol, absorbed into lymph vessels called lacteals, and then enters the bloodstream. Fat digestion also requires bile for emulsification

Describe defaecation reflex in infants.

In infants, defaecation is a reflex that happens automatically when the rectum fills. Their nervous system is not fully developed, so they have no voluntary control. The anal sphincters relax involuntarily, and stool is passed without conscious effort.

Describe defaecation reflex in adults.

In adults, defaecation involves both involuntary and voluntary actions. When the rectum is full, stretch receptors send signals to the brain. The person then decides when to relax the external anal sphincter. This allows for controlled bowel movements.

Bile juice contains no digestive enzymes, yet it is important for digestion. Why?

Bile helps in digestion by emulsifying fats—breaking them into small droplets. This increases the surface area for lipase enzymes to act. It also helps in neutralizing stomach acid and absorbing fat-soluble vitamins. So, bile is essential even without enzymes.

What is the role of hormone gastrin in digestion?

Gastrin is a hormone released by the stomach when food enters. It stimulates the secretion of gastric acid (HCl) and digestive enzymes. Gastrin also increases stomach motility. It helps prepare the stomach for efficient digestion.

What is the role of hormone secretin in digestion?

Secretin is released from the small intestine when acidic food enters from the stomach. It signals the pancreas to release bicarbonate-rich juice. This neutralizes stomach acid, creating the right environment for digestive enzymes in the intestine.

Describe the storage role of liver.

The liver stores glycogen, which is a form of stored glucose for energy. It also stores vitamins (like A, D, B12) and minerals (like iron and copper). These nutrients are released when needed. The liver also helps in detoxifying harmful substances.

What is gall bladder? Write its function.

The gall bladder is a small pouch under the liver that stores bile. It releases bile into the small intestine during digestion of fats. Bile helps break fats into smaller droplets, making it easier for enzymes to digest them.

Write difference between pharynx and larynx , pepsinogen and pepsin.

Pharynx & Larynx

1. System Involved
   - Pharynx : Part of both the digestive and respiratory system.
   - Larynx : Part of the respiratory system only.
2. Location
   - Pharynx : Located behind the nose and mouth.
   - Larynx : Located below the pharynx and above the trachea.
3. Function
   - Pharynx : Helps in swallowing food.
   - Larynx : Helps in producing sound (voice box).
4. Passage Type
   - Pharynx : Allows passage of both food and air.
   - Larynx : Allows passage of only air.

Pepsinogen & Pepsin

1. Form
   - Pepsinogen : It is the inactive form of the enzyme.
   - Pepsin : It is the active form of the enzyme.
2. Site of Secretion / Activation
   - Pepsinogen : Secreted by chief cells in the stomach.
   - Pepsin : Formed when pepsinogen is activated by HCl.
3. Function in Digestion
   - Pepsinogen : Does not digest proteins.
   - Pepsin : Digests proteins into peptides.
4. Importance / Conditions for Activation
   - Pepsinogen : Prevents self-digestion of stomach cells.
   - Pepsin : Active only in acidic conditions (low pH)