EXTENSIVE QUESTIONS

30. Describe human oral cavity. What is the function of cavity?

Ans: Oral Cavity:

The mouth is surrounded by the lips, cheeks, tongue and a palate and includes a chamber between the palate and tongue called **oral cavity.**

Tongue:

The tongue nearly fills the oral cavity when the mouth is closed. Rough projection called **papillae** on the surface of the tongue cause friction, which is useful in handing the food. These papillae also contain **taste buds**

Palate:

The **palate** forms the roof of the oral cavity. It consists of a hard-anterior part the **hard palate** and a soft posterior part the **soft palate**.

Teeth:

There are 32 teeth. Different teeth are adapted to handle food in different ways. The **incisors** (front teeth) are chisel shaped and their sharp edges used to bite off relatively large pieces of food. The **canine teeth** are cone shaped and they are useful in grasping or tearing food.

Premolars and Molars:

The **premolars** and molars have somewhat flattened surface and are specialized for grinding food particles.

Salivary Glands:

There are three pairs of **salivary glands:** parotide or parotis,

submandibular and sublingual. These glands secrete saliva having enzyme.

Function of oral cavity:

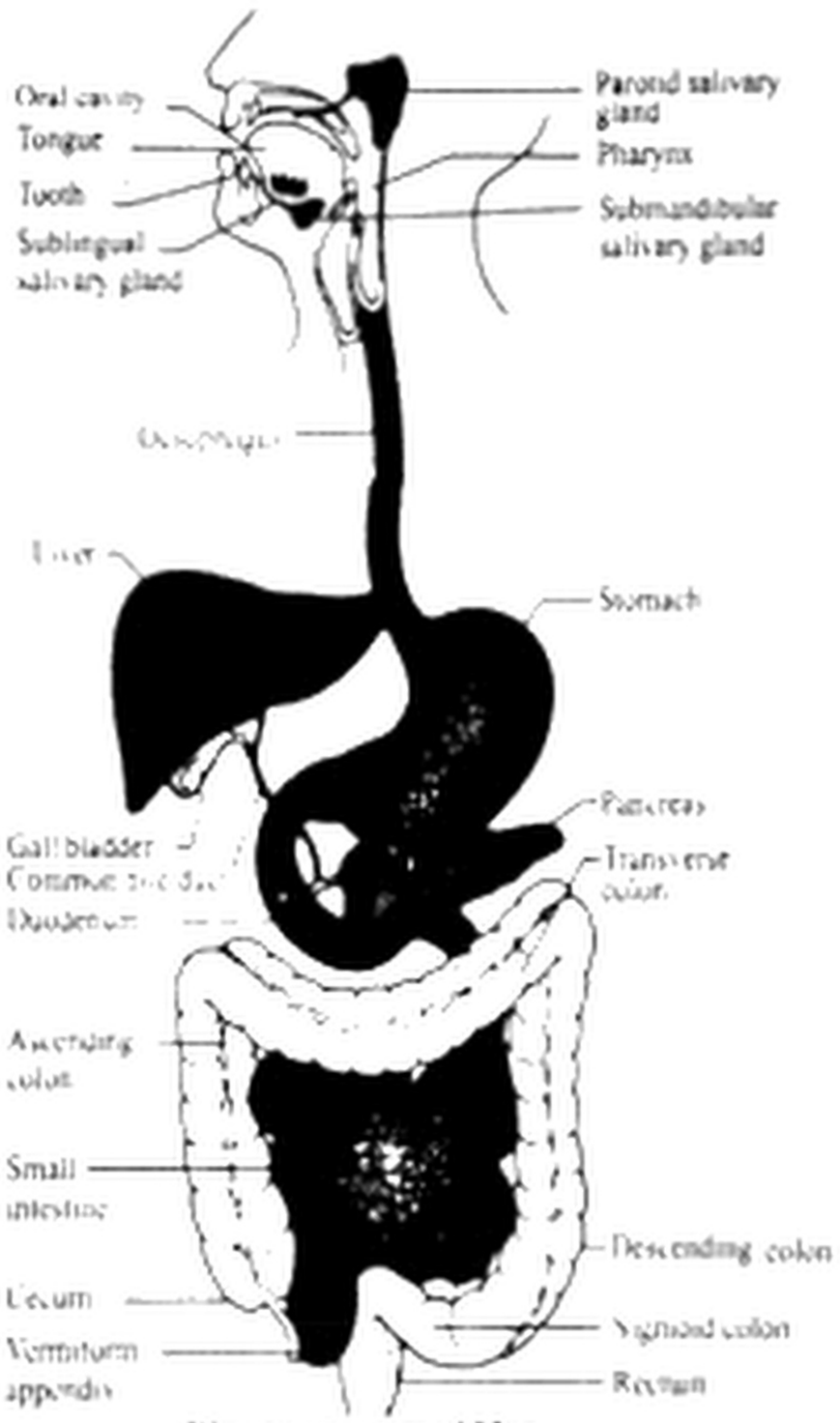
In the oral cavity mechanical and chemical digestion takes place. Mechanical digestion is the physical division of a mass of food into smaller masses while chemical digestion is the chemical conversion of larger molecules into smaller molecules.

Mechanical digestion:

Cooking and through chewing of food destroys the cellulose of starch covering and increases the efficiency of the digestive process. Food taken into the mouth is chewed or masticated by the teeth. Mastication breaks large food particles into smaller ones, which have a much larger total surface area for the action of digestive enzymes.

Chemical digestion:

Saliva is secreted by salivary glands. The serous (watery) part of saliva contains a digestive enzyme called **salivary amylase (**meaning, starch-splitting enzyme). This breaks the covalent bonds between glucose molecules in starch and other polysaccharides to produce the disaccharides maltose and is maltose. Only about 3%-5% of the total carbohydrates are digested in the mouth.



Digestive System of Man

Composition of Saliva

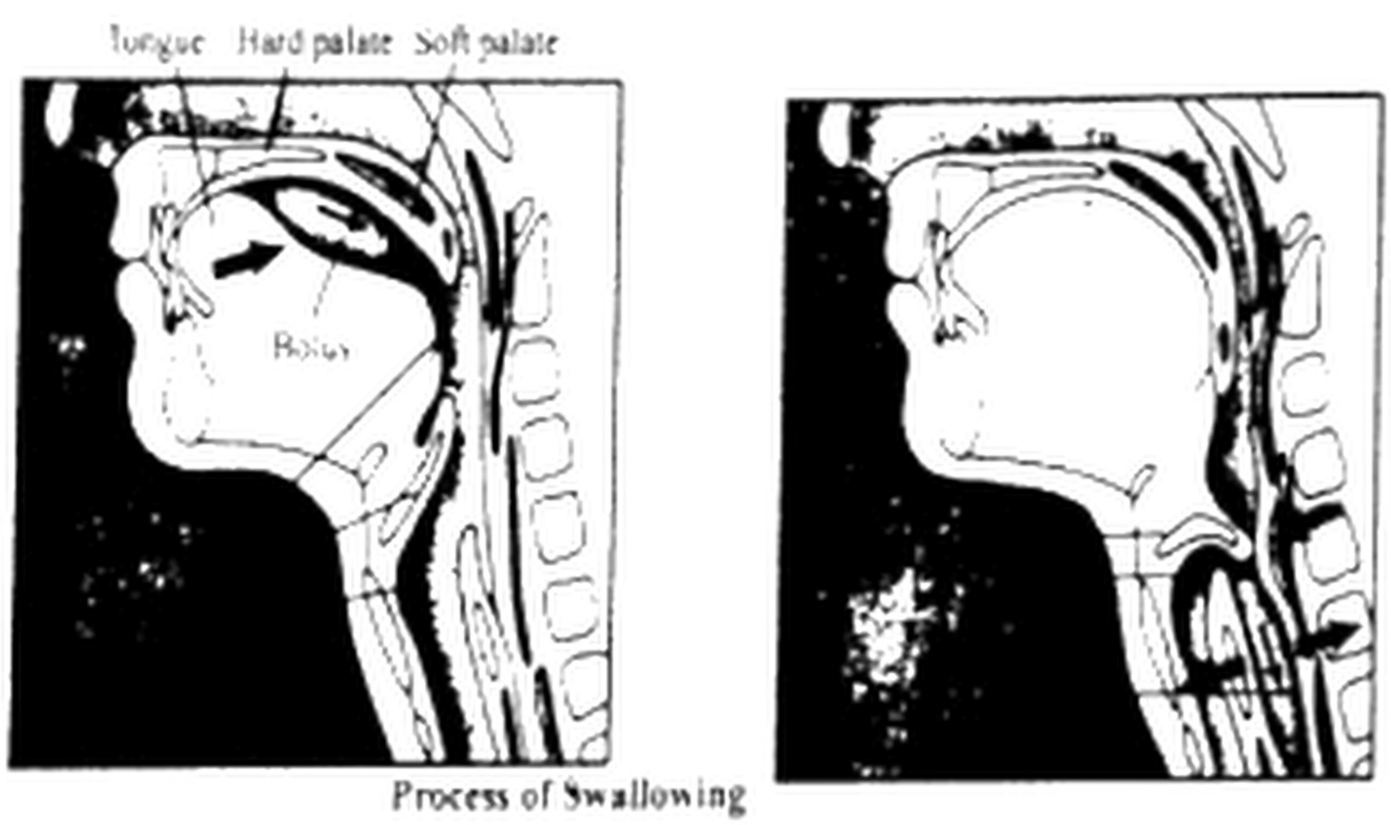
Salivary amylase digests starch. Mucin is a proteoglycan that gives lubricating quality to the secretions of the salivary glands. Water moistens food and mucous membrane. Saliva also contains various mineral salts including chloride ions, which speed up the activity of enzymes. Saliva prevents bacterial infection in the mouth as it contains lysozyme and immunoglobulin. Saliva has a pH between 6.00 and 70. A favorable range for the digestive action of amylase.

31. Describes the process of the swallowing in man.
Ans: Swallowing:

The tongue forms the chewed and moistened food into a ball like mass called bolus and pushes it into the pharynx (oropharynx).

Muscles raised the soft palate against the back wall of the pharynx which closes the passage between nasal cavity and pharynx preventing food from entering the nasal cavity.

The pressure of the food in the pharynx stimulates nerves in its walls that begin the swallowing reflex, an involuntary action. As part of this reflex action the voice box or **larynx** rises up to meet the epiglottis (meaning upon the glottis) with this action epiglottis cartilage drops over the glottis, the opening to the larynx and trachea. In this way food is passed over the trachea without entering it. If you place your hand over larynx (Adams, apple) you can feel it moves up when you swallow. After food enter the oesophagus, the soft palate lowers and the epiglottis is raised.

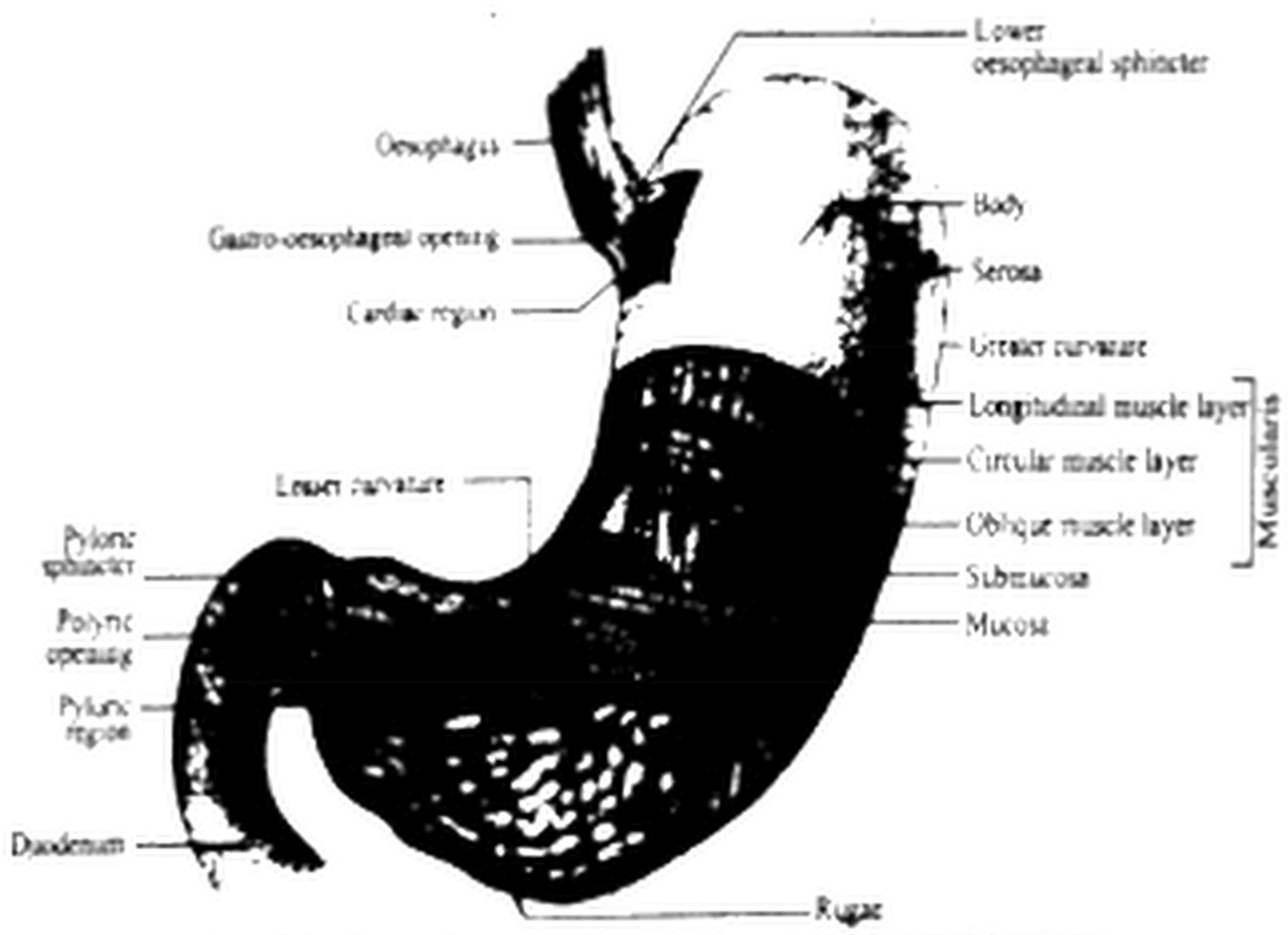


Process of Swallowing

32. Describe the human stomach with diagram.

Ans: Stomach:

The stomach is an enlarged segment of the digestive tract in the left superior part of the abdomen immediately below the diaphragm.



Cutaway section of the Stomach reveals Muscular layers and internal Anatomy

Structure:

Typically, j-shaped when empty, the stomach is continuous with the oesophagus and anteriorly and empties into the small intestine posteriorly.

Cardiac opening:

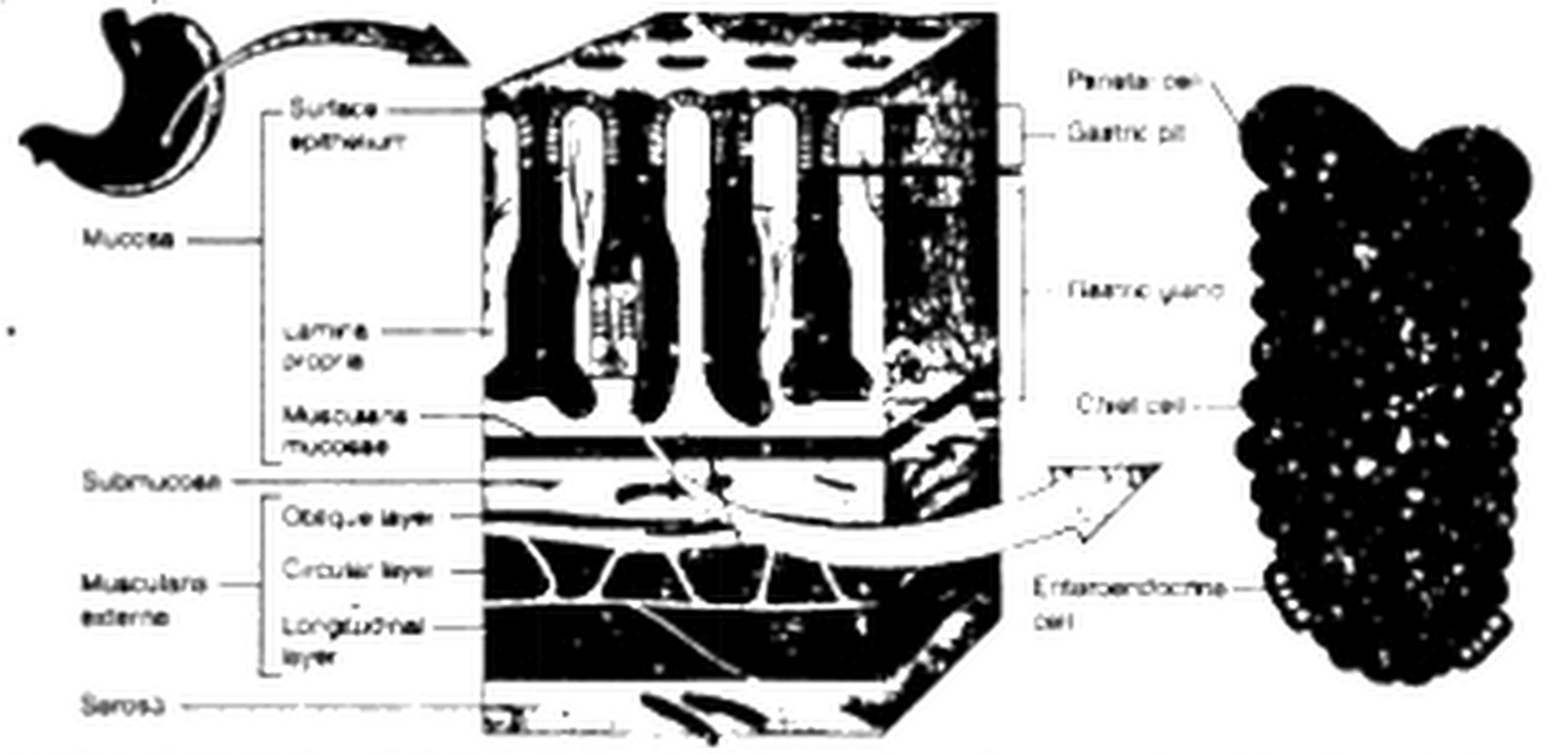
The opening from the oesophagus into the stomach is the **cardiac opening (**located near the heart). The **cardiac sphincter** surrounds the cardiac opening although this is an important structure in the normal function of the stomach, it is the physiologic constrictor only and cannot be seen anatomically.

Body of stomach:

The largest part of stomach is the body which narrow to from the pyloric (meaning gatekeeper) **region**, that joins the small intestine.

Pyloric Opening:

The opening between the stomach and the small intestine is the **pyloric opening**, which is surrounded by a relatively thick ring of smooth muscle called the pyloric sphincter.



section of stomach wall that illustrates its histology, including several gastric pits and glands

A section of stomach wall that illustrates its histology, including several gastric pits and glands

Layer of the stomach:

The **serosa** or vertical peritoneum is the outer most layer of the stomach. The **muscularis** of the stomach consists of three layers, an outer longitudinal layer. An outer longitudinal layer, a middle circular layer and an inner oblique layer. The next two layers are **submucosa and mcosa.** The stomach id lined with simple columnar epithelium. The mucosal surface forms numerous tube like **gastric pits**, which are the opening for the gastric glands.

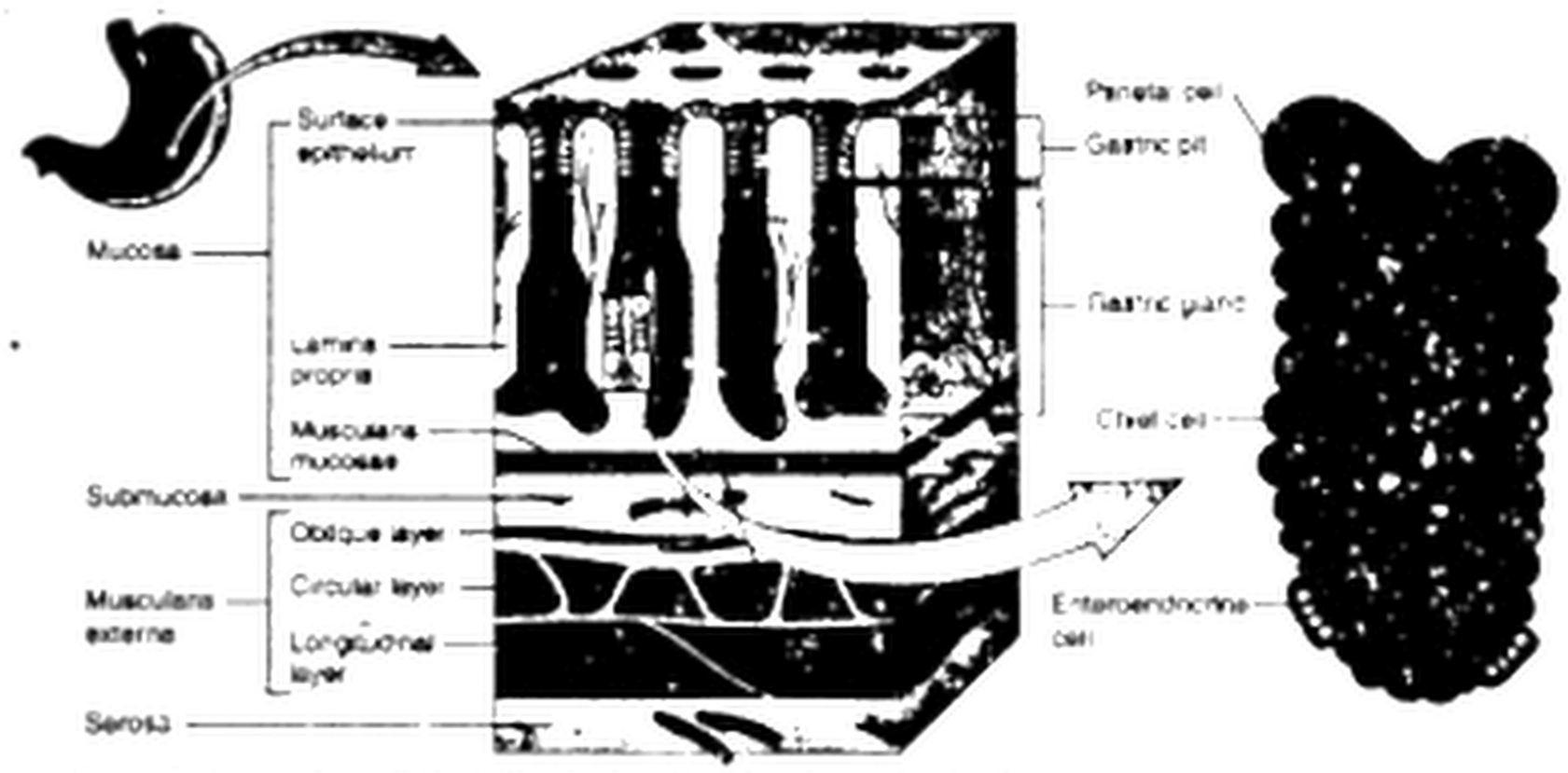
The epithelial cells of stomach can be divided into four types. The first type is **surface mucous cells**, which produce mucus, is on the surface and lines the gastric pit. The remaining three are in the gastric gland.

They are.

(1) Parietal (oxyntic) cells produce hydrochloric acid and intrinsic factors.
(2) Principal cells or chief (zymogenic) cells secrete pepsinogen.
(3) Endocrine cells secrete the hormone gastrin into the blood.

33. Draw, describe and label section of human stomach wall.

Ans:



section of stomach wall that illustrates its histology, including several gastric pits and glands

34. Describe the function of human stomach.

Ans: Function of stomach:

Digestion in the stomach can be divided into two types. Mechanical digestion and chemical digestion.

Mechanical digestion:

The mixing action of the stomach walls allows mechanical digestions to occur in the stomach. The smooth muscles of the stomach

produce contractions known as **mixing waves.** This is made efficient by the fact that unlike other region of the alimentary canal the stomach has three layers of smooth muscles. The churning action of the stomach or mixing waves mix the boluses of food with gastric juice. This mixing leads to the production of the thick liquid known as **chyme** (meaning juice).

Chemical digestion:

Stomach secretion includes mucus, hydrochloric acid, gastrin, intrinsic factor and pepsinogen. The mucous cells secrete viscous and alkaline **mucus.** The thick layer of mucous lubricates and protects the epithelial cells of the stomach wall from the damaging effect of the acidic chyme and pepsin.

Functions of components of gastric juice:

Parietal cells in the gastric gland of the pyloric region secrete intrinsic factor and a concentrated solution of hydrochloric acid **intrinsic factor** is a glycoprotein that binds with vitamin B12 and makes the vitamin more readily absorbed in the ileum. **Hydrochloric acid** produces the low pH of the stomach, which normally between 1 and 3, but is usually close to 2. Although the hydrochloric acid secreted into the stomach has a minor digestive effect on digested food. One of its main function is to kill bacteria that are ingested with essentially everything humans put into their mouths. The low pH of the stomach also stops carbohydrate digestion by inactivating salivary amylase. The low pH also denatures many proteins so that proteolytic enzymes can reach internal peptide bonds, and it provides the proper pH environment for the function of pepsin.

Chief cells within the gastric secrete inactive **pepsinogen**. Pepsinogen is packaged in **zymogen (**meaning related to enzyme) granules, which are released by exocytosis when pepsinogen secretion is stimulated. Once **pepsinogen** enters the lumen of the stomach, it is converted to **pepsin** by hydrochloric acid and previously formed pepsin molecules. Pepsin exhibits

optimum enzymatic activity at a pH of 3 or less. Pepsin catalyzes the cleavage of some covalent bonds in protein, breaking them into smaller peptide chains.

35. What is the role of nervous system and gastrin hormone on the secretion of gastric juice?

Ans: Role of nervous system and gastrin hormone on the secretion of gastric juice: Approximately 2-3 liters of gastric secretion (gastric juice) are produced each day. Both nervous and hormonal mechanisms regulate gastric secretions.

Hormones that regulate secretions:

Hormones that regulate stomach secretions include gastrin, secretin, gastric inhibitory polypeptide and cholecystokinin.

Gastric Secretion:

The sensations of the taste and smell of food stimulation of tactile receptors during the process of chewing and swallowing and pleasant thought of food stimulate centres within medulla that influences **gastric secretion.** Neuronal stimulation of the stomach mcosa results in the secretion of **acetylcholine,** which stimulates the secretory activity of both the parietal and chief cells and stimulates the secretion of **gastrin** from endocrine cells. Gastrin is released into the circulation and travels to the parietal cells, where it stimulates additional gastric juice (hydrochloric acid and pepsinogen) secretion.

Volume of Gastric Secretion:

The greatest volume of gastric secretion is initiated by the presence of food in the stomach. The primary stimulation are distention of the

stomach and the presence of amino acid and peptides in the stomach. Peristaltic waves occur less frequently are significantly more powerful than mixing waves and force the chyme near periphery of the stomach toward the pyloric sphincter. The pyloric sphincter usually remains partially closed because of mild tonic contraction. Each peristaltic contraction is sufficiently strong to force a small amount of chyme through the pyloric opening and into the duodenum.

36. Describe the structure of human small intestine.

Ans: Small intestine:

The small intestine consists of three parts:

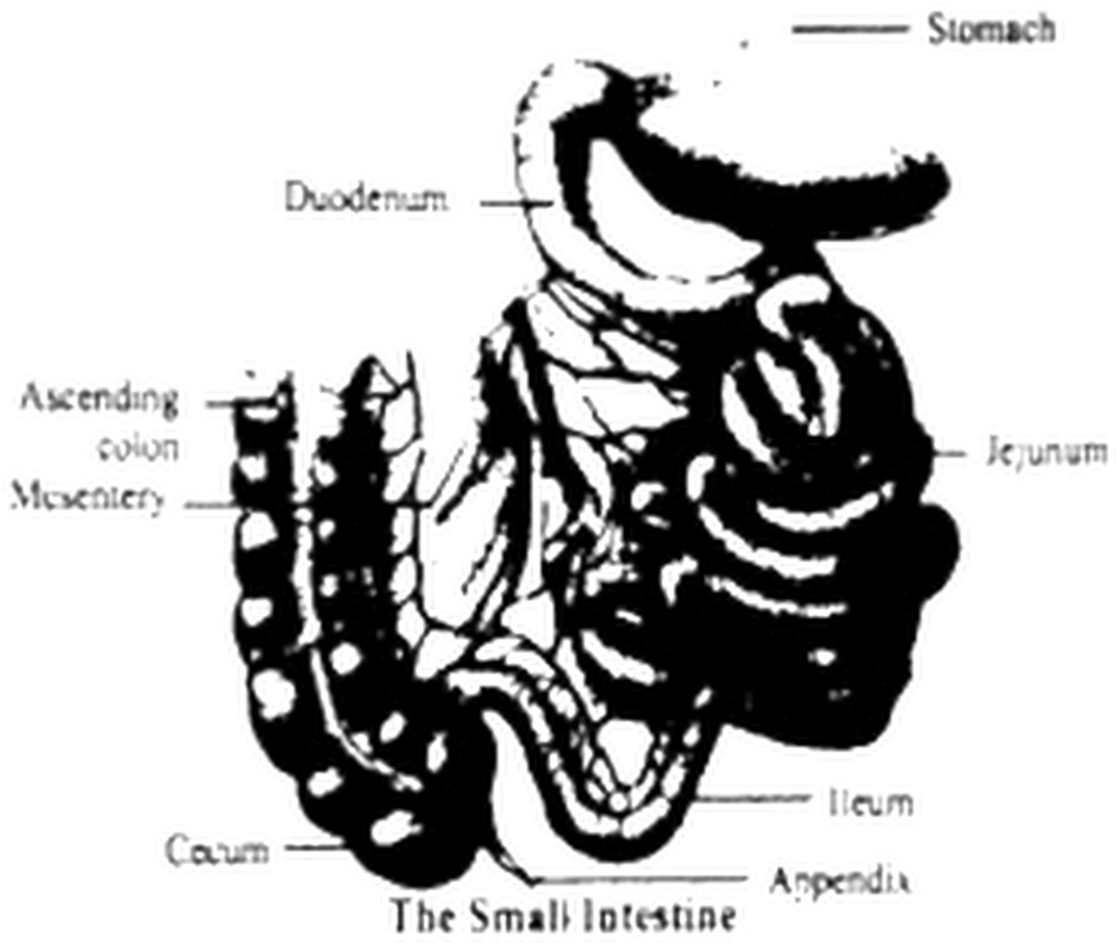
i. The duodenum (meaning twelve fingers breath in length)
ii. The jejunm (meaning empty because after death no food is found here jejunum comes from Latin "*jejunus*" meaning hungry)
iii. The ileum(meaning twisted)

Length of small Intestine:

The entire small intestine is about 6 m long (range 4 6-9 m) The duodenum Is about 25 cm long and 5cm in diameter, and the ileum is about 3.5 m long.

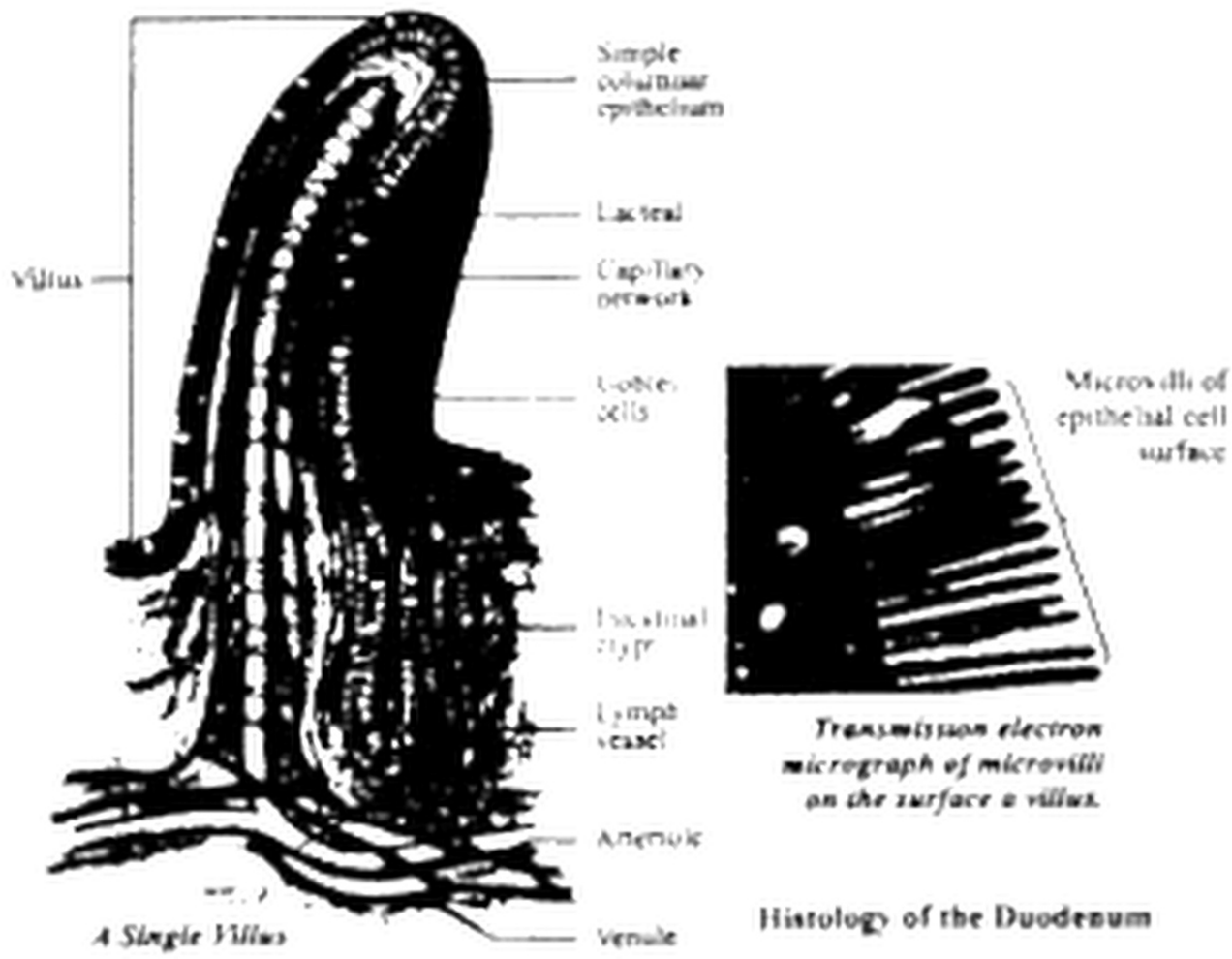
Structure of small Intestine:

These portions are suspended from the posterior abdominal wall by a double- layered fold of peritoneum called **mesentery.** Two major accessory grlands the liver and the pancreas are associated with the duodenum.



The Small Intestine

The **duodenum** begins with a short superior part, which is where it exits the pylorus of the stomach and ends in a sharp bend, where it joins the jejunm. Tiny finger like projection of the mucosa from numerous **villi** (meaning shaggy hair). Which are 0.5-1.5 mm in length. Each villus is covered by simple columnar epithelium. It contains a blood capillary network and a lymph capillary called a **lacteal.**



A Single Villus

Microvilli of epithelial cell surface

Transmission electron micrograph of microvilli on the surface a villus.

Histology of the Duodenum

The **jejunum and ileum** are similar in structure to the duodenum, except that there is a gradual decrease in the diameter of the small "intestine" the thickness of the intestinal wall, the number of circular folds and the number of villi as one progress through the small intestine. The duodenum and jejunum are the major sites of nutrient absorption. The junction between the ileum and the large intestine is the **ileocecal junction.** It has a ring of smooth muscle the **ileocecal sphincter, (**also written as ileocolic sphincter) and increase surface area of a one – way **ileocecal valve.**

The structural features increase the surface area of small intestine and make it the largest part of the alimentary canal. The internal walls are folded to increase surface area for absorption. Villi and microvilli further increase surface area for absorption.

37. Describe the major actions carried out in food in the three regions of small intestine.

Ans: Digestion in the three regions of the small intestine:

We have already seen that the small intestine is duodenum, jejunum and ileum.

Digestion in duodenum:

We food enters the duodenum the secretions of pancreas and live are poured into it.

Pancreatic juice:

The secretion of pancreas is called pancreatic juice. It is poured through the pancreatic duct. Pancreatic juice is slightly alkaline. Its pH is about 8. It neutralizes the acidic action of digestive enzymes secreted by the pancreas. The important enzymes are (a) Pancreatic amylase, (b) Pancreatic lipase, (c) Trypsinogen, (d) Chymotrypsin.

Pancreatic amylase:

It is the starch digesting enzyme. It hydrolyses the polysaccharides to maltose and even to glucose.

Pancreatic lipase:

It is the principal enzyme for the hydrolysis of fats. It hydrolyses fats to neutral fat in parts to its (i) mono and diglycerols (diglycerides), (ii) glycerol, (iii) Fatty acids.

Enzyme precursors:

Two important enzyme precursors are found in pancreatic juice. They are trypsinogen and chymotrypsin. Both are the inactive forms.

Trypsinogen:

The intestinal glands secrete an activator enzyme called enterokinase. The enterokinase converts trypsinogen into trypsin. The trypsin is the active form, which acts on proteins and converts them into polypeptides.

Chymotrypsin:

The inactive chymotrypsin is converted to active form by trypsin.

Bile:

Bile is manufactured in liver but stored in gall bladder. Bile emulsifies fat causing them to breakdown into numerous small droplets called emulsion. Emulsification provides relatively large surface are of lipid for the action of lipase enzyme and hence speed up the digestion of fats and oils. (You will study more about bile later on in this chapter).

Digestion in jejunum and ileum:

Here the digestion of protein carbohydrates and fats is completed. The lining of the jejunum and ileum secrete several enzymes.

Amino peptidase: It spits polypeptides into dipeptides and amino acids

Enterokinase: It converts trypsinogen to trypsin.

Dipeptidase: Such as **(a) Erepsin:** It splits peptidome into amino acids, **(b) Lactase:** It converts lactose to glucose and fructose **(c) Maltase:** It converts maltose to glucose. **(d) Sucrase:** It converts sucrose to glucose and fructose.

Pancreatic lipase: It completes the digestion of fats into fatty acids and glycerol.

Chye: By the action of enzymes, chime is turned into a watery emulsion called chyle.

38. Explain the absorption of digested products from the small Intestine lumen to the blood capillaries and lacteals of the villi.

Ans: Absorption of digested food from the lumen of intestine:

To reach the blood or lymph a nutrient molecule must pass through an epithelial cell of the intestinal lining and through a cell lining the blood capillaries or lymph vessel.

Absorption of carbohydrates:

Absorption occurs by a combination of simple diffusion and active transport. The monosaccharides are transferred by facilitated diffusion to the capillaries of intestinal villi and are carried by the hepatic portal, system to the

liver, where non-glucose sugars are converted to glucose. Glucose enters the cell through facilitated diffusion.

Absorption of Lipids:

The primary products of the digestive process are free fatty acids and glycerol. Cholesterol and phospholipids also constitute part of the lipid digestion products. Once lipids are digested in the intestine, bile salts aggregate around small droplets to form micelles (meaning a small morsel). When a micelle comes into contact with the epithelial cell of the small intestines, the contents of micelle pass by means of simple diffusion through the lipid cell membrane of the epithelial cell.

After glycerol and fatty acid are absorbed by epithelial cells, they are recombined into fats within these cells. The facts are then mixed with cholesterol and proteins, forming small globules called **chylomicrons,** most of which are transported by exocytosis out epithelial cells into lacteals. Lymph containing chylomicrons, eventually drains from the lymphatic system into large veins that return blood to the heart.

Absorption of Protein:

Once the proteins and polypeptide chains leave the stomach, proteolytic **enzymes** produced in the pancreas continue the digestive process, producing small **peptide chains.** These are broken down into dipeptide, tripeptides and amino acids by **peptidases** bound to the **microvilli** of the small intestine. Dipeptides and tripeptides enter intestine epithelial cells. Once inside the cells, dipeptidase and tripeptides split the dipeptides and tripeptides into their component amino acids. Individual amino acids then leave the epithelial cells and enter the **hepatic portal system**, which transports them to the **liver.** The amino acids may be modified in the liver or released into the bloodstream and

distributed throughout the body. Most amino acids are used as building blocks to form new proteins, but some amino acids may be used for energy.

39. Describe the large intestine of man. What are the functions of large intestine?

Ans: Large intestine:

The **caecum** (North American spelling: cecum), which is the proximal end of the large intestine, is where the large and small intestine meet. He caecum extends inferiorly about 6 cm behind the ileocecal junction in the form of a blind sac. Attached to the inferior surface of the caecum is a small blind tube about 9 cm long called the **vermiform appendix.** The walls of the appendix contain many lymph nodules. The **colon** is about 1.5 to1.8 m long and consists of four parts, the **ascending colon, transverse colon, descending colon, and sigmoid colon.** The **rectum** (means: straight) is a straight, muscular tube that begins at the termination of the sigmoid colon and ends at the anal canal. The last 2-3 cm of the digestive tract is the **anal canal.** It begins at the inferior end of the **rectum** and ends at the **anus (**external GI tract opening). The smooth muscle layer and skeletal muscle form **sphincter** of the anal canal.

Functions of large intestine:

The large intestine performs several important functions. The major functions of the large intestine are:

(a) Absorbing water

(b) Absorption of vitamins

(c) Reducing acidity and protecting from infections

(a) Absorbing water and electrolytes:

Further digestion or breaking down of nutrients does not take place in the large intestine. The proximal half of the large intestine functions to reabsorb some of

the water and electrolytes making the stools solid. The substances that remain in the tube becomes faeces (North American spelling feces), which is stored for a time in the distal portion of the large intestine.

(b) Absorption of vitamins:

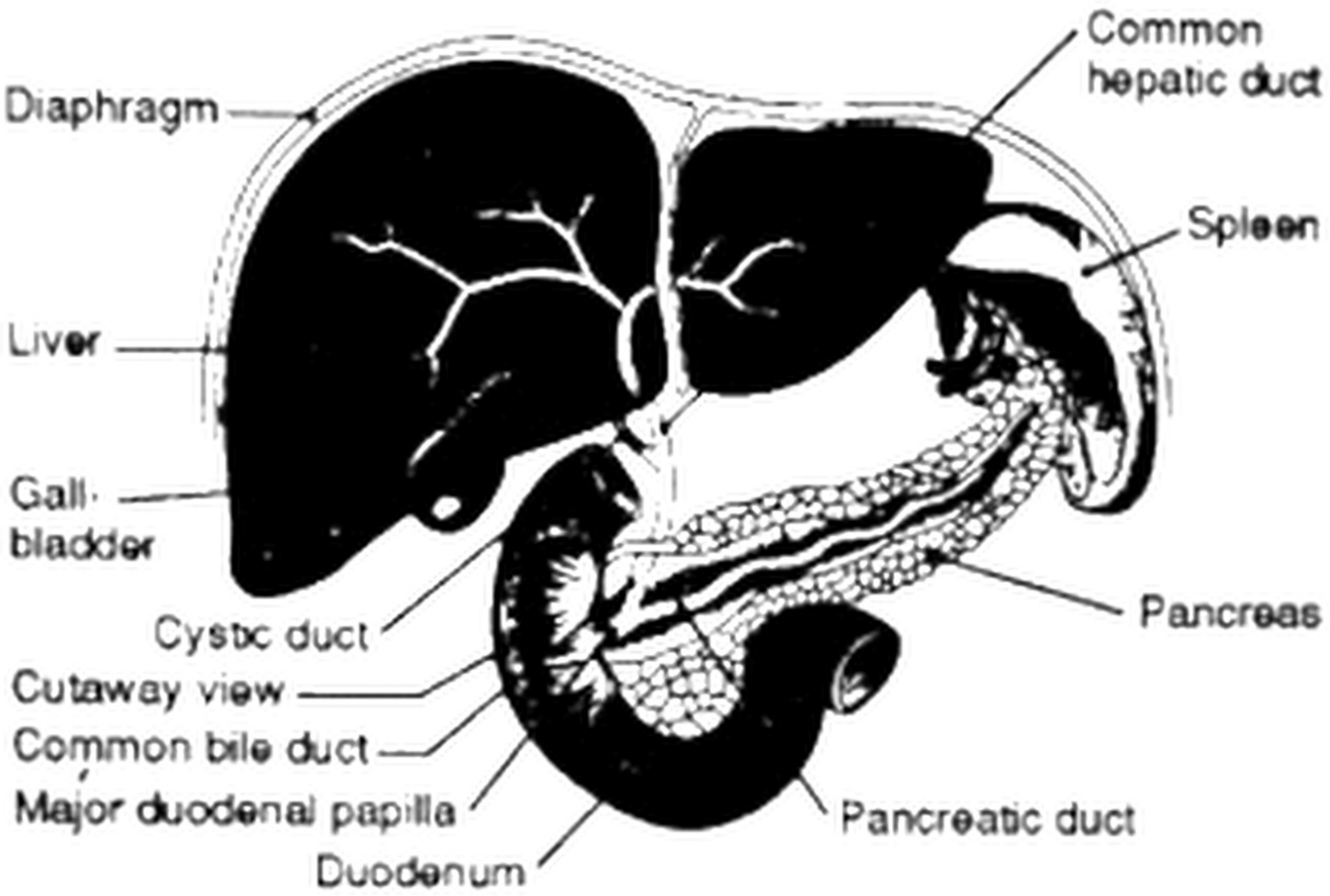
The large intestine also helps in absorption of vitamins made by bacteria that normally line large intestine. These bacteria also produce large amounts of vitamins. The most important of these is Vitamin K and Biotin (a B vitamin)

(c) Reducing acidity and protecting from infections:

The mucosa of the large intestine also secretes bicarbonates to neutralize the increased acidity resulting from the formation of these fatty acids and other digestive components at earlier parts of the intestines.

40. Describe the structure of liver.

Ans: Liver: The liver is the largest internal organ of the body. The liver consists of two major lobes, left and right, and two minor lobes. A **porta** (gate) is on the inferior surface of the liver where the various vessels, ducts, and nerves enter and exit the liver. The **hepatic ducts** transport **bile** out of the liver. The right and left hepatic ducts unite to form a single **common hepatic duct.** The common hepatic duct is joined by the **cystic duct** from the gall bladder to form the **common bile duct,** which empties into the duodenum at the major duodenal papilla in union with the pancreatic duct.



Duct system of the major abdominal digestive glands

41. What is bile? Describe the composition of bile. What is the role of constituents of bile? How secretion of bile is related to the secretion?

Ans: Composition of bile:

The liver produces and secretes bile. It is stored in the gall bladder. Bile contains no digestive enzymes. Bile consists: sodium glycocholate and sodium taurocholate, bile pigment, bilirubin, cholesterols, lecithin (a phospholipids) mucus, cells and call debris.

Role of constituents of bile:

bile salts reduce the surface tension of fat globules, emulsify them into droplets, and thus increase their total surface area. This process is called emulsification. These small droplets are then acted upon by the enzyme lipase. **Bilirubin** results for the breakdown of hemoglobin. In the intestine, bacteria convert bilirubin into pigments that give the faeces its characteristic brown colour. Some of these pigments are absorbed from intestine, modified in the kidneys and excreted in the urine, contributing to the characteristic yellowish colour of the urine. Bile salts

help in the absorption of fatty acids from the intestinal tract.

Secretion of bile is related to secretin hormone:

Fatty acids in the lumen of the duodenum stimulate endocrine cells to release the hormone cholecystokinin (CCK). CCK stimulates contractions in the smooth muscle of the gall bladder. CCK also causes relaxation of the hepatopancreatic sphincter allowing bile release into the duodenum. Acidic chyme in the lumen of the duodenum stimulates other endocrine cells to release the hormone **secretin.** Secretin produced by the duodenum is carried through the circulatory system to the liver and stimulates duct cell in the liver to release bicarbonate into the bile.

42. Write the functions of the liver of mam.

Ans: Functions of liver:

The liver performs important digestive and excretory function, stores and processes nutrients, synthesizes new molecules and detoxifies harmful chemicals.

Storage role of liver:

Hepatocytes can remove sugar from the blood and store it in the form of glycogen. They can also store fat, vitamins (A, B12, D, E, and K), copper and iron. This **storage function** is usually short-term and the amount of stored material in the hepatocytes varies, thus the cell size fluctuates during a given day.

Metabolic role of liver:

Metabolism of glucose occurs in liver. Whenever needed, glucose is obtained by the hydrolysis f glycogen (glycogenosis). Glucose is also synthesized

from amino acids or fatty acids and glycerol (gluconeogenesis). Denaturation of fatty acids and phosphorylation of fats takes place in liver cells. Excess of amino acids undergo deamination producing pyruvic acid and ammonia. Ammonia produced by deamination of amino acids in hepatic cells is converted to urea (omithine-arginine cycle).

Synthesis of vitamin A from carotid (carotene) and synthesis of albumin from amino acids takes place in liver. Formation of blood proteins (like prothrombin, fibrinogen) are synthesized in liver cells. These are necessary for blood clotting. **Phagocytosis** also occurs in liver i.e. dead RBCs are destroyed. The bile pigments **bilirubin** (orange pigment) and **biliverdin** (green pigment) are formed from the breakdown hemoglobin. Liver produces **heparin**, an enzyme that prevents clotting of blood inside the blood vessels. Red blood cells are formed during foetal (US spelling: fetal) life. **Detoxification** occurs in liver.

43. What is the structure of pancreas? Explain the functions of pancreas as an exocrine gland.

Ans: Pancreas: The **Pancreas** is a complex organ composed of both endocrine and exocrine tissues that perform several functions.

Part of Pancreas: The pancreas consists a head, located within the curvature of the duodenum, a body and a tail, which extends to the spleen. The endocrine part of the pancreas consists of **pancreatic islets** (islets of Langrhans).

Pancreas as an exocrine gland:

The exocrine secretion of the pancreas is called **pancreatic juice** and has two major components: an aqueous component and an enzymatic component. Bicarbonate neutralizes the acidic chyme that enters the small intestine from the stomach. The **enzymatic component** of the pancreatic juice is

important for the digestion of all major classes of food. The major proteolytic enzymes are **trypsin, chymotrypsin,** and **carboxypeptidase.**

They are secreted in their inactive forms as trypsinogen, chymotrypsin, and PR carboxypeptidase and are activated by the removal of certain peptides from the larger precursor proteins. If these were produced in their active forms, they would digest the tissues producing them. Trypsinogen is activated by the proteolytic enzyme enterokinase (meaning, intestinal enzyme) into **trypsin**

Trypsin then activates more trypsinogen, as well as **chymotrypsin** and **PR carboxypeptidase. Amylase,** continues the polysaccharide digestion that was initiated in the oral cavity. **Pancreatic lipases,** breakdown lipids into free fatty acids, glycerides, cholesterol. **Deoxyribonucleases** and **ribonucleases**, reduce DNA and ribonucleic acid to their component nucleotides, respectively.

44. Describe the aetiology, prevention and treatment of the following disorders:

(a) Ulcer (b) Food poisoning (c) Dyspepsia

Ans: (a) Ulcer: Aetiology (North American spelling: etiology, means the medical study of the causation of disease): Peptic ulcer is classically viewed as a condition in which the stomach acids digest the mucosal lining of the GI tract itself.

i. *Helicobacter pylori* is the most important factor in peptic ulcer disease accounting for accounting for 90% of duodenal ulcer and 70% of the gastric ulcer.
ii. Asprine (acetyl salicylic acid) and other non-steroidal anti-inflammatory agents are an important aetiologic factor.
iii. Peptic ulcer tends to run in families i.e. it is a hereditary disease.

Prevention:

Aggravating factors such as smoking aspirin, excess intake of coffee and tea alcohol, missing a meal are to be avoided.

Treatment:

The relieving factors of ulcer are antacid and milk, vomiting relieves pain in gastric ulcer, and intake of food relieves pain in duodenal ulcer. Medicines for acid suppression are the first choice of therapy.

(b) Food poisoning:

It includes diarrhea (North American spelling diarrhea), vomiting and abdominal pain. It is an illness from indigestion of food containing toxic substances.

Aetiology:

Due to the **toxins** produced by bacteria. *Salmonella* and *Campylobacter.*

Prevention:

Basic hygiene should be followed. Avoid unboiled/unbottled water ice, cubes, salads and peel on fruits. Consume freshly prepared hot food or thoroughly rewarmed food.

Treatment:

Soft easily digested diet such as soup, fruits drinks, tea and cold drinks are preferred. Oral rehydration salt (ORS) is given. Antidiarrheal agents such as Loperamide antibiotics are prescribed.

(c) Dyspepsia:

Incomplete or imperfect digestion is called dyspepsia.

Aetiology:

It may occur due to excessive acidity in stomach or faulty function of stomach and intestine or insufficient quality and quantity of bile secretion.

Prevention:

Avoid food that worsens symptoms. Stop smoking, weight reduction, small meals, avoid alcohol, tea, fatty food, heavy lifting, bending specially after meals and late-night meals to reduce reflex during sleep.

Treatment: Antibiotics to be given against this disease. Drugs which decrease HCl production such as Cimetidine stop NSAID (Non-Steroidal Anti-Inflammatory Drugs) e.g. Aspirin.

45. Describe obesity in terms of its causes, preventions and related disorders.

Ans: Obesity:

When a person has abnormal amount of fat on the body It is called obesity.

Aetiology:

Excessive intake of food is responsible for obesity. Emotional disturbances, inherited tendency to obesity, disorder of the thyroid, pituitary or adrenal glands etc, can also cause obesity.

Prevention:

Food should be taken according to energy intake and energy expenditure. Diet control, regular exercise can prevent obesity.

Related disorders:

The distribution of fat difference can be clinically significant because upper body obesity is associated with an increased likelihood of diabetes mellitus, cardiovascular disease, and stroke. Many other diseases are associated with obesity like angina heart failure anemia, arthritis etc. Obesity shortens life expectancy.

46. Explain the symptoms and treatments of:
(a) Bulimia nervosa (b) Anorexia nervosa

Ans: (a) Bulimia nervosa:

Symptoms:

It is a neurotic disorder in slightly older girls. It is characterized by bouts of over eating fattening food such as fried food or cream cakes. This voracious (eating in large quantity) eating followed immediately by self-induced vomiting fasting or purging (to empty bowels) may cause physical effects including serum electrolytes imbalance and frequent recurring infections.

Treatment:

Treatment of bulimics is likely to be prolonged. The initial treatment is to overcome the effects of weight loss and malnutrition. It is necessary to undertake the treatment in hospital under strict supervision.

(b) Anorexia nervosa:

It is the loss of appetite due to the fear of becoming obese. Such a feeling is common in human females between the ages of 12 and 21 years. Usually just after the onset of puberty.

Symptoms:

It includes loss of appetite due to the fear of becoming obese. The anorexic girls over estimate the size of her own body and so insist that she is overweight, when in reality her weight has dropped to a dangerous level. These girls are often not matured psychologically and unable to cope with the challenges of puberty and their emerging sexuality. The losses of feminine characteristics enable the girls to retreat into a childlike state in which she feels safe.

Therapy:

Psychiatric therapy is usually required to treat anorexic girls. Such patients are fed through any other route other than alimentary canal i.e. intravenously. The recovery is very slow. It may take 2-4 years and, in some cases, longer.