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Q1.ANSWER

DIGESTIVE SYSTEM

The system of organs responsible for getting food into and out of the body and for making use of food to keep the body healthy. It is important for breaking down food into nutrients, which the body uses for energy, growth, and cell repair. Food and drink must be changed into smaller molecules of nutrients before the blood absorbs them and carries them to cells throughout the body. The gastrointestinal tract (digestive tract, digestive tract, GI tract, GIT, gut or alimentary canal) is an organ system within humans and other animals which takes in food and digests it, absorbs energy and nutrients, and expels the remaining waste as feces.

TWO TYPES OF DIGESTION

MECHANICAL DIGESTION

It involves physically breaking the food into smaller pieces. Mechanical digestion begins in the mouth as the food is chewed.

CHEMICAL DIGESTION

It involves breaking down the food into simpler nutrients that can be used by the cells.

THE MAJOR ORGANS OF THE DIGESTIVE SYSTEM:

- > MOUTH
- > PHARYNX
- > ESOPHAGUS
- > STOMACH
- > SMALL INTESTINE
- > LARGE INTESTINE
- > RECTUM

ACCESSORY DIGESTIVE ORGANS:

- . LIVER
- . GALLBLADDER
- . PANCREAS
- . SALIVARY GLANDS

FUNCTIONS OF GI TRACT

INGESTION: Taking of food into the alimentary tract. i.e. eating and drinking.

PROPULSION: Mixes and moves the content along the alimentary tract.

DIGESTION: Mechanical breakdown of food e.g. mastication (chewing)

Chemical digestion of food into small molecules by enzymes.

ABSORPTION: In this process we digest food substance pass through the walls of some organs of the alimentary canal into the blood for circulation.

ELIMINATION: Food substances that have been eaten but cannot be digested and absorbed are excreted from the alimentary canal as faeces by the process of defaecation.

MOUTH

1. TONGUE
2. TEETH
3. SALIVARY GLANDS

TONGUE :

- . Primary organ of taste
- . Manipulate food for mastication and used in the act swallowing.
- . chewing
- . swallowing
- . speech
- . taste

TEETH

four types of teeth

- . Two incisor- for cuuting
- . One canine- for tearing
- . Two premolar- for crushing
- . Three molar- for grinding

SALIVARY GLANDS

- . 3 major salivary glands in human
- . **PAROITED**
- . **SUBMANDIBULAR**
- . **SUBLINGUAL**
- . As well hundreds of minor salivary glands.

MINOR SALIVARY GLANDS

. Ther are 800 to 1000 minor salivary glands located throughout the oral cavity within the submucosa of the oral mucosa, in the tissue of the buccal cavity and lingual mucosa.

SALIVA IS COMPSED OF

- . **WATER**
- . **MINERAL SALTS**
- . **AN ENZYME**
- . **MUCUS**
- . **LYSOZYME**
- . **IMMUNOGLOBINS**

PHARYNX

- > It is approximately 12.5 centimeters.
- > It is a part of both digestive and respiratory system.

It is the part of the throat that is behind the mouth and nasal cavity and above the esophagus and the larynx.

The pharynx is the portion of the digestive tract that receives the food from our mouth.

THE ESOPHAGUS

- . LENGTH 25 CM
- . DIAMETER 2 CM
- . Esophagus is commonly known as the food pipe. It is a muscular tube connecting the throat with the stomach.
- . it runs behind the windpipe, trachea and in front of the spine.
- . Esophagus has two sphincters in its wall.
- . Sphincter is circular muscle that normally maintains constriction of a natural body.

FUNCTIONS

- . Esophagus is highway for food and drink to travel along to make it to the stomach.
- . formation of a bolus
- . swallowing

. food is ingested through the mouth and when swallowed passes first into the pharynx and then into the esophagus.

PERISTALSIS: Series of involuntary wave like muscle contractions which move food along the digestive tract.

STOMACH

- > A pouch like organ designed for food storage for 2-4 hours.
- > Stomach contains two sphincter at both ends to regulate food movement.
- > CARDIAC SPHINCTER near the esophagus
- > PYLORIC SPHINCTER near the small intestine

FOUR REGIONS :
CARDIAC STOMACH
FUNDIC STOMACH
BODY OF STOMACH
PYLORIC STOMACH

> Stomach contain thick folds called rugae at its layer for providing larger surface area for expansion, secretion, digestion, and absorption.

THE PANCREAS

- LENGTH 6 INCH
- A large gland which secretes digestive enzyme into the duodenum.

STRUCTURE

- Divided into the head of pancreas

- Neck of pancreas
- Body of pancreas
- Tail of pancreas

FUNCTION

- Pancreas has a dual function. It acts exocrine gland that secretes digestive enzymes and it acts also endocrine gland that secretes hormone.
- Pancreas is involved in blood sugar control and metabolism within in the body.
- Pancreatic islets are present in the pancreas.
- Islets are four types of cell
- ALPHA CELLS secrete glucagon
- BETA CELLS secrete insulin
- DELTA CELLS secrete somatostatin
- GAMMA CELLS secrete pancreatic polypeptide

THE LIVER

Liver is a large lobed glandular organ in the abdomen of vertebrates , involved in many metabolic process

An organ that detoxifies various metabolites , synthesizes proteins, and produces biochemicals necessary for digestion.

STRUCTURE

- Liver is reddish brown wedge shape organ.
- Weights 1.44 - 1.66 kg
- width -15 cm.
- Liver is both the heaviest internal organ and the largest gland in the human body.

FUNCTIONS

. SYNTHESIS

- . Proteins produced and secreted by liver.
- . Liver plays a major role in carbohydrate , protein , amino acid and lipid metabolism.

. BREAKDOWN

- . Liver is responsible for the breakdown of insulin and other hormones.
- . It breaks down bilirubin facilitating its excretion into bile.

. The liver stores a multitude of substances, including glucose

- . vitamin A
- . Vitamin D
- . Vitamin B12
- . Vitamin k, iron, and copper.

. The liver produces albumin, the most abundant protein in blood serum.

- . BLOOD SUPPLY
- . VENOUS DRAINAGE

THE GALLBLADDER

. The gallbladder is a small hollow organ where bile is stored and concentrated before it is released into the small intestine.

. In humans, the pear-shaped gallbladder lies beneath the liver.

STRUCTURE

- . LENGTH 7 TO 10 CM
- . DIAMETER -4 CM
- . The gallblader has a capacity of about 50 millilitres
- . It is shaped like a pear, with its tip opening into the cystic duct.
- . It has 3 sections (THE FUNDUS , THE BODY , THE NECK)

FUNCTIONS

- . Main purpose of the gallbladder is to store bile , needed for the digestion of fats i food.
- . Effect on pH of bile
- . secretion of mucous
- . Concentration of bile beacuse thicker, visous and darker.

THE SMALL INTESTINE

- > The small intestine is the part of the gastrointestinal tract between the stomachand the large intestine, and is where most of the end absorption of food takes place.
- > STRUCTURE
- > LENGTH 3M-5M
- > DIAMETER 3CM OR 1INCH

3 STRUCTURAL PARTS OF SMALL INTESTINE

1. DUODENUM: It is a short structure ranging from 20cm to 25cm in length, and shaped like a "c".
2. JEJUNUM: It is the mid section of the small intestine, connecting the duodenum to the ileum.
3. ILEUM: Is the final section of the small intestine

FUNCTIONS

- > DIGESTION: The most chemical digestion take place in small intestine.
- > Many of the digestive enzymes that act in the small intestine are secreted by the pancreas and liver.
- > digestion of protein and carbohydrates.

THE LARGE INTESTINE

- . The large intestine, also known as the large bowel or colon, is the last part of the gastrointestinal tract.
- . Water is absorbed here and the remaining water material is stored as feces before being removed by defecation.

STRUCTURE

- . The length of male colon is 166cm and female colon is 155cm
- . Five sections of colon
 - . ASCENDING COLON
 - . TRANSVERSE COLON
 - . DESCENDING COLON
 - . SIGMOID COLON AND THE RECTUM

FUNCTIONS

- . The large intestine absorbs water and any remaining

absorbable nutrients from the food before sending the indigestible matter to the rectum.
. The colon absorbs vitamins that are created by the colonic bacteria, such as vitamin K.

Q2 .ANSWER

KIDNEYS INVOLVED IN URINE FORMATION

URINARY SYSTEM:

The urinary system , also known as the renal system or urinary tract, consists of

- .THE KIDNEYS (TWO)
- .URETERS (TWO)
- .BLADDER (ONE)
- .URETHRA (ONE)

The purpose of the urinary system is to eliminate waste from the body, regulate blood volume and blood pressure, control levels of electrolytes and metabolites, and regulate blood pH.

- . Urinary tract is the body drainage system for removal of urine.
- . Kidneys have an extensive blood supply to the renal arteries which leave the kidneys via renal vein.
- . kidneys consist of functional units called nephrons

NEPHRON

- . The microscopic structure and functional unit of kidney
- . Composed of renal corpuscle and a renal tubule.
- . Renal corpuscle consists of capillaries called glomerulus.
- . Encompassing Bowman's capsule.
- . About 10 lakh nephrons present in each human kidney.

THE URETERS

The ureters are a pair of narrow, thick walled muscular tubes which convey urine from kidneys to urinary bladder.

- . Ureters is about 25 cm long
- . Upper half in abdomen and lower half in pelvis
- . Ureters moves urine from kidney to bladder
- . Made up smooth muscles which can undergo into spasm in certain circumstances.

URINARY BLADDER

> The urinary bladder is a hollow muscular organ which functions as the reservoir for the urine received from the kidneys and to discharge it out periodically.

> Capacity about 220ml and upto 500ml be tolerated.

> The inner mucous membrane has folds, when bladder is distended, these folds disappear.

> The posterior wall is a smooth triangular area called trigone.

> Urinary bladder stores urine, allowing urination to be infrequent and controlled.

THE URETHRA

- . Urethra is a canal extending from the neck of the bladder to the exterior, at the external urethral orifice.
- . Male about 20cm long and female 3-4cm long.
- . Females have more urinary tract infections than males.
- . Ascending bacteria from stool contamination.
- . It connects the urinary bladder to the penis in man.
- . Urine flows through the urethra and leaves the body at the urethral meatus.
- . It also serves as a conduit for semen and sperm during sexual acts.

URINE FORMATION

- . Kidneys filter unwanted substances from the blood and produce urine to excrete them.
- . Three main steps of urine formation.

1. FILTRATION
2. REABSORPTION
3. SECRETION

FILTRATION:

- > Blood courses through the glomerulus and much of its fluid.
- > Containing both useful chemical and dissolved waste

materials.

- > It is filtered and then flows into Bowman's capsule.
- > The product form is collectively known as glomerular filtrate.

REABSORPTION:

- > Movement of substances out of the renal tubules back into the blood capillaries located around the tubules.
- > Substances reabsorbed are water, glucose, and other nutrients sodium, and other ions.
- > About 99 percent of the 180L of water that leave the blood each day by glomerular filtration.
- > Amount depends largely on how much salt we take in from the foods that we eat.

SECRETION:

- > Substances move into the distal collecting tubules from blood in the capillaries around these tubules.
- > Secretion is reabsorption in reverse.
- > Substances are secreted through either an active transport or as a result of diffusion across the membrane.
- > Secretion plays a crucial role in maintaining the body acid - base balance.

