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COURSE TITLE: **HUMAN ANATOMY II**

QUESTION

Miss Egbe Amanda attended a birthday party organized by Mr. Solomon, during the party she was served fried rice, salad, fried chicken and water. Enumerate in details the digestive processes of the above food she ate during the celebration.

FRIED RICE

The mechanical and chemical digestion of carbohydrates begins in the mouth. Chewing crumbles, the carbohydrate foods into smaller and smaller pieces. The salivary glands in the oral cavity secrete saliva that coats the food particles. Saliva contains the enzyme, salivary amylase. This enzyme breaks the bonds between the monomeric sugar units of disaccharides and starches. The salivary enzyme amylase begins the breakdown of food starches into maltose, a disaccharide. As the bolus of food travels through the oesophagus to the stomach, no significant digestion of carbohydrates takes place.

The Oesophagus produces no digestive enzymes but does produce mucous for lubrication. The acidic environment in the stomach stops the action of the amylase enzyme. As the food goes down the esophagus it has a protective layer called the epithelial layer. It prevents sharp foods from scrapping the esophagus. Food then reaches the end of the esophagus and arrives at the cardiac sphincter connecting to the stomach.

At this stage, the food is referred to as chyme. The stomach makes acid to kill bacteria in the chyme before it makes its next step in the digestion journey. The chyme is gradually expelled into the upper part of the small intestine. Upon entry of the chyme into the small intestine, the pancreas releases pancreatic juice through a duct. This pancreatic juice contains the enzyme, pancreatic amylase, which starts again the breakdown of dextrin into shorter and shorter carbohydrate chains. Additionally, enzymes are secreted by the intestinal cells that line the villi. These enzymes, known collectively as disaccharidase, are sucrase, maltase, and lactase. Sucrase breaks sucrose into glucose and fructose molecules. Maltase breaks the bond between the two glucose units of maltose, and lactase breaks the bond between galactose and glucose. Once carbohydrates are chemically broken down into single sugar units they are then transported into the inside of intestinal cells.

The cells in the small intestine have membranes that contain many transport proteins in order to get the monosaccharides and other nutrients into the blood where they can be distributed to the rest of the body. The first organ to receive glucose, fructose, and galactose is the liver. The liver takes them up and converts galactose to glucose, breaks fructose into even smaller carbon-containing units, and either stores glucose as glycogen or exports it back to the blood.

Insulin-secreting cells in the pancreas sense the increase in blood glucose and release the hormone, insulin, into the blood. Insulin sends a signal to the body's cells to remove glucose from the blood by transporting it into different organ cells around the body and using it to make energy. In the case of muscle tissue and the liver, insulin sends the biological message to store glucose away as glycogen.

Some of the remaining indigestible carbohydrates are broken down by enzymes released by bacteria in the large intestine. The products of bacterial digestion of these slow-releasing carbohydrates are short-chain fatty acids and some gases. The short-chain fatty acids are either used by the bacteria to make energy and grow, are eliminated in the feces, or are absorbed into cells of the colon, with a small amount being transported to the liver. Colonic cells use the short-chain fatty acids to support some of their functions. The liver can also metabolize the short-chain fatty acids into cellular energy.

Consist of the colon and the anus, opening the rectum to the anus which absorbs water, salts, and some vitamins. The walls of the colon absorb water, vitamins and minerals from the liquid mixture that traveled through the descending colon. The muscles then move the watery waste and slowly absorb all the excess water.

Anything that’s left over after these digestive processes goes to the colon. It’s then broken down by intestinal bacteria. Fiber is contained in many carbohydrates and cannot be digested by the body. It reaches the colon and is then eliminated with your stools

The muscles contract and move the waste until it is expelled into the rectum which opens the anus where the waste is eliminated.

SALAD

The bulk of a lettuce head's weight -- almost 95 percent, according to caloriefacts.org -- comes from water, with the remainder primarily from carbohydrates. Lettuce also contains nominal amounts of protein and fat, although these nutrient levels are so small, they do not contribute greatly to your nutrition. However, even the smallest quantity of a food's nutrients undergoes digestion.

CARBOHYDRATE

After water, carbohydrate is the most abundant nutrient in green leaf lettuce, although it makes up less than 3 percent of the lettuce's weight. As you chew lettuce, salivary enzymes begin the process of breaking down its digestible carbohydrates into smaller sugar units. This process continues with the help of pancreatic enzymes once the partially digested lettuce carbohydrates reach your small intestine. When the carbohydrates are fully digested into glucose molecules, your small intestine then absorbs the glucose. The indigestible fiber portion of the lettuce continues on to your large intestine, where you eventually excrete it in your feces.

PROTEIN

Protein contains less than 2 percent of the weight of green leaf lettuce. Consuming lettuce, the digestion process for its protein content begins in your stomach. Here, the high acidity of the gastric juices unfolds the protein structure, and an enzyme called pepsin begins to break the protein molecules into smaller fragments known as peptides. As the peptides travel to the small intestine, they meet with digestive enzymes secreted from both the pancreas and the walls of the small intestine. These enzymes continue to break down the peptides to their individual amino acids. At this point, the digestion process stops, and the process of your small intestine absorbing the amino acids begins.

FAT

Fat is the least abundant macronutrient in green leaf lettuce, comprising less than 1 percent by weight. The small amount of fat travels to your small intestine, where a specific digestive enzyme, secreted by your pancreas, breaks down the triglyceride, or fat molecule, into its component fatty acids and glycerol. Your small intestine then absorbs the fatty acids and glycerol and moves them into your bloodstream.

WATER, VITAMINS AND MINERALS

In addition to small quantities of protein, carbohydrate and fat, green leaf lettuce contains water, vitamins and minerals. However, these nutrients do not undergo digestion, as they are able to be absorbed in their existing state. Water travels to your large intestine for absorption, while vitamins and minerals tag on to other bits of digested food for absorption in your small intestine.

FRIED CHICKEN

Fried chicken contains:

Protein

The teeth begin the mechanical breakdown of the chicken pieces into smaller pieces that can be swallowed. The salivary glands provide some saliva to aid swallowing and the passage of the partially mashed chicken through the oesophagus. The mashed chicken pieces enter the stomach through the esophageal sphincter. The stomach releases gastric juices containing hydrochloric acid and the enzyme, pepsin, which initiate the breakdown of the protein. The acidity of the stomach facilitates the unfolding of the proteins that still retain part of their three-dimensional structure after cooking and helps break down the protein aggregates formed during cooking. Pepsin, which is secreted by the cells that line the stomach, dismantles the protein chains into smaller and smaller fragments. Chicken proteins are large globular molecules and their chemical breakdown requires time and mixing. Protein digestion requires the chemical actions of gastric juice and the mechanical actions of the stomach.

From the Stomach to the Small Intestine

The stomach empties the chyme containing the broken-down chicken pieces into the small intestine, where the majority of protein digestion occurs. The pancreas secretes digestive juice that contains more enzymes that further break down the protein fragments. The two major pancreatic enzymes that digest proteins are chymotrypsin and trypsin. The cells that line the small intestine release additional enzymes that finally break apart the smaller protein fragments into the individual amino acids. The muscle contractions of the small intestine mix and propel the digested proteins to the absorption sites. In the lower parts of the small intestine, the amino acids are transported from the intestinal lumen through the intestinal cells to the blood. Once the amino acids are in the blood, they are transported to the liver. As with other macronutrients, the liver is the checkpoint for amino acid distribution and any further breakdown of amino acids, which is very minimal. Urea is a molecule that contains two nitrogen and is highly soluble in water. This makes it a good choice for transporting excess nitrogen out of the body.

Carbohydrates

In your mouth, your teeth mechanically digest the lipids, carbohydrates, and proteins, and your salivary glands secrete salivary amylase which breaks carbohydrates into simple sugars.

Lipids

The liver produces bile which is not an enzyme, but it aids in digestion by breaking lipids down to smaller lipids (mechanically) which allow the lipase to have more surface area to react on. The chicken, now mashed up, goes to the stomach where pepsin is produced. Pepsin is an enzyme that changes proteins into amino acids in the stomach. The gallbladder stores the bile that the liver produces. The pancreas produces Lipase, to break lipids down to fatty acids and glycerol, pancreatic amylase to break carbohydrates into simple sugars, and trypsin to break proteins down to amino acids. In the small intestine, the lipase, trypsin, and pancreatic amylase that were produced in the pancreas actually do the breaking down of your food.

WATER

Water's journey first begins in your mouth. Water travels through Your oesophagus. It is a small pipe connected to the mouth and lands in the stomach. This is where the process of water absorption to the bloodstream begins. The amount of water absorbed in the stomach and how quickly water is absorbed depends, in part, on how much has been eaten. If someone is drinking water on an empty stomach, they are more likely to experience a faster rate of water absorption.

Small Intestine

The small intestine, efficiently absorbs water into the cell membrane and bloodstream. From here, water will travel to cells across the body, providing them with the hydration to perform daily functions efficiently.

Large Intestine

The large intestine is the key center for water reabsorption rather than the stomach and the small intestine because of the following reasons:

- It prevents most of the paracellular flow of water and electrolytes because of tight junctions, unlike in the small intestine. This prevents the backflow of electrolytes and water from the chyle to the blood.
- It is mainly involved in concentrating the fecal matter, so reabsorption of water and electrolytes becomes its main function.