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DEPARTMENT: BIOMEDICAL ENGINEERING

COURSE CODE: ANA 226

COURSE TITLE: HUMAN ANATOMY II

ASSIGNMENT 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.

ANSWER:

The Digestive Processes of the food Miss Egbe Amanda ate during the celebration

Before we look into the digestive process of the food taken in by Miss Egbe Amanda, we must first understand the term “Digestion”. Digestion as defined by Wikipedia is the breakdown of large insoluble food molecules into small water-soluble food molecules so that they can be absorbed into the watery blood plasma. Therefore, we refer to the digestive processes that the food Miss Egbe ate as the system that involves the ingestion and digestion of the food,

absorption of released nutrients, and excretion of the food components that are indigestible.

In summary, **The Digestive Process** occurs in six steps or activities, they are:

- Ingestion
- Propulsion,
- Mechanical or Physical Digestion
- Chemical digestion
- Absorption
- Defecation.

STEP 1: “INGESTION”:

For the digestive process to commence, ingestion must first take place.

Formally, ingestion is referred to as the entry of food into the alimentary canal through **the mouth**. Therefore, we can conclude that from the moment Miss Egbe takes a spoon of the fried rice she was served the digestive process has begun. During this process, the food chewed gets mixed with saliva (the digestive juice of the mouth) to begin the process of breaking it down into a form your body can absorb and use. The digestive functions of the saliva include moistening food, and helping to create a food bolus, so it can be swallowed easily.

Saliva contains the enzyme amylase that breaks some starches (like the fried rice ingested) down into maltose and dextrin.

Food leaves the mouth when the tongue and pharyngeal muscles propel it into **the oesophagus** and with the aid of a small flap of tissue called epiglottis, which folds over Amanda's windpipe, she doesn't experience choking during the passage of the food. However, this act of swallowing is the last voluntary act she will make until defecation because once the broken down food is passed to her oesophagus, her brain will send signals to the muscles of her oesophagus, so that a process called peristalsis will begin.

STEP 2: "PROPULSION":

Propulsion refers to the movement of food through the **digestive tract** **otherwise called the Gastrointestinal Tract (GI Tract)**. It includes both the voluntary process of swallowing and the involuntary process of peristalsis.

Peristalsis consists of sequential, alternating waves of contraction and relaxation of alimentary wall smooth muscles, which act to propel food along. These waves also will play a role in mixing Amanda's food with digestive juices. The foods and liquids Amanda swallows will enter her stomach even if she is standing upside down during the party, due to the process of peristalsis which is powerful.

Before we discuss the next step in the digestive process, it must be noted that digestion includes both mechanical and chemical processes.

STEP 3: “MECHANICAL OR PHYSICAL DIGESTION”:

Mechanical digestion is a purely physical process that does not change the chemical nature of the food but rather, makes the food smaller to increase both surface area and mobility. It includes mastication, or chewing, as well as tongue movements that help break food into smaller bits and mix food with saliva (which have already been discussed under the ingestion process).

Although there may be a tendency to think that mechanical digestion is limited to the first steps of the digestive process, it occurs after the food leaves the mouth, as well.

The mechanical churning of food in Amanda’s **stomach** serves to further break it apart and expose more of its surface area to digestive juices, creating an acidic “soup” called chyme. Her stomach will then slowly empty its contents (chyme) into her small intestine.

Segmentation, which occurs mainly in **the small intestine**, consists of localized contractions of circular muscle of the muscularis layer of the alimentary canal. These contractions isolate small sections of the intestine, moving their contents back and forth while continuously subdividing, breaking up, and mixing the contents. By moving food back and forth in the intestinal lumen, segmentation mixes food with digestive juices and facilitates absorption.

STEP 4: “CHEMICAL DIGESTION”:

In chemical digestion, starting in Amanda’s mouth, digestive secretions break down complex food molecules into their chemical building blocks. This process is aided by **the pancreas** which will use its pancreatic juice that contain some enzymes to convert the food molecules. This means that Proteins (fried chicken) Amanda has consumed break into amino acids, fats (from the fried chicken) break into fatty acids and glycerol and the Carbohydrates (fried rice) break into simple sugars. Although, these secretions vary in composition, they typically contain water, various enzymes, acids, and salts. The pancreas will then deliver the digestive juice to the small intestine through small tubes called ducts for the process to be completed. Also, **the liver** of Amanda will use a digestive juice called bile to digest the fats and some vitamins (salad). The digestive content will then be transferred through bile ducts to the small intestine or stored in **the gall bladder** of Amanda.

Note that the water and other nutrients consumed by Miss Egbe will be efficiently absorbed by her small intestine into her cell membrane, bloodstream and GI tract. After which it will travel to cells across her body with the aid of her circulatory system, providing them with the hydration to perform daily functions efficiently. This point brings us to the next step.

STEP 5: “ABSORPTION”:

Food that has been broken down is of no value to the body unless it enters the bloodstream and its nutrients are put to work. This occurs through the process of absorption, which takes place primarily within the small intestine. There, most nutrients are absorbed from the lumen of the alimentary canal into the bloodstream through the epithelial cells that make up the mucosa. Lipids are absorbed into lacteals and are transported via the lymphatic vessels to the bloodstream (the subclavian veins near the heart).

In summary, the walls of the small intestine of Amanda absorb water and digested nutrients into her bloodstream so that as peristalsis continues, the waste products of her entire digestive process move into her **large intestine**. This introduces us to the final process in Miss. Egbe’s digestion.

STEP 6: “DEFECATION”:

In the defecation process which is the final step in digestion, undigested materials are removed from the body as faeces or stool. In Amanda’s large intestine, a bacteria will aid the further breakdown of the residual nutrients and make Vitamin K. Here waste products, (including undigested food, fluid and older cells that might be in the lining of her GI tract) of Amanda’s digestive process especially those that are still too large will become stool. Peristalsis will then aid in moving the stool to the lower part of her large intestine which is **the**

rectum. The rectum stores stool until it is passed out from Amanda's body through her anus during a bowel movement. This will then bring an end to the digestive process of Miss. Egbe Amanda. This entire process will take anywhere from 24-72 hours to complete.

Note that Amanda's digestive process cannot be complete without all the parts of her digestive system which have been highlighted above; which are the Gastrointestinal Tract, GI Tract (the mouth, oesophagus, stomach, small intestine, large intestine and anus), the liver, the pancreas and the gall bladder.