**Digestive Lab Report**

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**Human Anatomy & Physiology II 2312- OL57**

**Tuesdays 2:30 – 5:00 pm**

**Intoduction**

For normal life, the body needs energy material. These substances enter the body with food. But only mineral salts, water and vitamins are assimilated by a person in the form in which they are in food. Proteins, fats and carbohydrates enter the body in the form of complex complexes, and complex physical and chemical processing of food is required in order to be absorbed and assimilated. In this case, food components must lose their species specificity, otherwise they will be accepted by the immune system as foreign substances. For these purposes, the digestive system serves.

The need for the digestive system for the life of the human body. In the process of life of the body, nutrients are continuously consumed, which have a plastic and energy function.

The body has a constant need for nutrients, which include: amino acids, glycine and fatty acids. The source of nutrients is a variety of foods, consisting of complex proteins, fats and carbohydrates, which are converted into simpler substances that can be absorbed during digestion.

The process of breaking down nutrients by enzymes into simple chemical compounds that are absorbed, transported to them, used, is called digestion. The sequential chain of processes leading to the breakdown of food substances into monomers that can be absorbed is called the digestive conveyor.

The digestive conveyor is a complex chemical conveyor with a pronounced consistency of product processing in all departments. Digestion is the main functional food system.

The digestive system includes organs that carry out mechanical and chemical processing of food, the absorption of nutrients and water into the blood or lymph, the formation and removal of undigested food debris. The digestive system consists of the alimentary canal and digestive glands.

The main functions of the organs of the digestive system are: secretory, motor and absorption. In the oral cavity, food is crushed and then subjected to complex chemical processing with digestive juices. Salivary glands secrete saliva, stomach glands, pancreas and intestinal glands - various juices, and the liver - bile.

As a result of exposure to these juices, proteins, fats and carbohydrates are broken down into simpler soluble compounds. For example, protein molecules are broken down into a large number of amino acids, fat molecules are broken down into glycerol and fatty acids, and many glucose molecules are formed from large starch molecules. From the breakdown products, proteins, fats and carbohydrates in the body, new organic compounds are formed only for it. Of course, all transformations are possible only when food moves through the alimentary canal and is thoroughly mixed. The movement and mixing of food is carried out due to powerful contractions of the muscles of the walls of the alimentary canal. The transfer of nutrients and water into the blood and lymph, i.e. the suction function is performed by the mucous membrane of individual sections of the alimentary canal.

2 STRUCTURE OF THE DIGESTIVE SYSTEM

The human digestive system consists of the following organs: oral cavity (mouth, tongue, teeth, chewing muscles, salivary glands, glands of the oral mucosa), pharynx, esophagus, stomach, duodenum, pancreas, liver, small intestines, large intestines , rectum. The esophagus, stomach, intestines consist of three membranes: the inner one - the mucous membrane, which contains the glands that secrete mucus, and in a number of organs and digestive juices; middle - muscle, providing by reducing the movement of food; external - serous, which acts as an integumentary layer. In humans, about 7 liters of digestive juices are released during the day, which include: water, which liquefies food gruel, mucus, which facilitates better movement of food, salts and enzymes, catalysts of biochemical processes that break down food substances into simple compound compounds. Depending on the effect on certain substances, enzymes are divided into proteases that break down proteins (proteins), amylases that break down carbohydrates, and lipases that break down fats (lipids). Each enzyme is active only in a specific environment (acidic or alkaline or neutral). As a result of cleavage, amino acids are obtained from proteins, from fats - glycerin and fatty acids, from carbohydrates, mainly glucose. Water, mineral salts, vitamins contained in food do not undergo changes during digestion.

Digestive enzymes

The digestion of nutrients in the digestive tract is carried out by hydrolytic enzymes. All enzymes are divided into 4 main groups: amylase, lipase, nuclease, protease. Enzymatic activity is characteristic of each part of the digestive tract and is maximum at a certain pH value of the medium. So, in the stomach, the digestive process is carried out in an acidic environment, in the duodenum, bile and pancreas are juicy or slightly alkaline, and gastric enzymes stop working.

## **Disorders Of The Digestive System**

Several disorders of the esophagus are esophagitis, esophageal spasm, and esophageal cancer. Esophagitis (heartburn) is an inflammation of the esophagus usually caused by the reflux of gastric acids into the esophagus and is treated with (alkalis) antacid. Esophageal spasm is also caused by acid reflux and is sometimes treated with nitroglycerine placed under the tongue. [Esophageal cancer](https://www.encyclopedia.com/medicine/diseases-and-conditions/pathology/esophageal-cancer) can be caused by smoking and is generally fatal.

Disorders of the stomach include hiatal hernia, ulcers, and gastric cancer. A hiatal hernia occurs when a portion of the stomach extends upwards into the thorax through a large opening in the diaphragm. People over the age of 50 years often contract the illness. Stomach ulcers are sores that form in the lining of the stomach. They may vary in size from a small sore to a deep cavity, surrounded by an inflamed area, sometimes called ulcer craters. Stomach ulcers and ulcers that form in the esophagus and in the lining of the duodenum are called peptic ulcers because they need stomach acid and the enzyme pepsin to form. Duodenal ulcers are the most common type. They tend to be smaller than stomach ulcers and heal more quickly. Ulcers that form in the stomach lining are called gastric ulcers. As of 2005, about six million people in the [United States](https://www.encyclopedia.com/places/united-states-and-canada/us-political-geography/united-states) have ulcers and 20% of those have gastric ulcers. About 10% of all adults in the [United States](https://www.encyclopedia.com/places/united-states-and-canada/us-political-geography/united-states) will have an ulcer at some point in their lives. Those people who are at most risk for ulcers are those who smoke, middle-age and older men, chronic users of alcohol, and those who take anti-inflammatory drugs, such as aspirin and ibuprofen.

**Objective**

The purpose of this lab activity was to examine the effects of digestive enzymes on their specific substances and observe the effects of environmental influences on digestion.

**Materials and Methods**

Materials :

Tubes, Starch, Amylase, Water, Cellulose, Peptidase, Bacteria, Glucose, Benedict solution, Iodine.

Experiment data shows seven different tubes of reagent of a Ph level of 7.0 buffer which is used to test the enzyme amylase on different substances. Enzymes are proteins that act as catalysts for biological reactions. Enzymes, like all catalysts, speed up reactions without being used up themselves. They do this by lowering the activation energy of a reaction. All biochemical reactions are catalyzed by enzymes. Since enzymes are proteins, they can be denatured in a variety of ways, so they are most active under mild conditions. Most enzymes have optimum activity at a neutral pH and at body temperature.

To test for the specificity of the enzyme amylase, the substrates glucose, cellulose and starch were used. Tubes 1 and 5 had glucose; tubes 3, 4 and 6 had cellulose; while tube 2 had glucose. Amylase was added to tubes 1 – 3, peptidase which breaks down peptidase was added to tube 5 as a negative control. Tube 4 had water instead of amylase serving as a negative control. In tube six bacteria were added in order to examine whether these bacteria have enzymes capable of digesting starch.

After 60 minutes incubation at 37 C, only tube 5 was positive for starch as indicated by a dark blue color after addition of IKP. For the Benedict’s test, tubes 1, 2 and 6 changed to a brown-orange color after boiling, indicating they were positive for reducing sugars, compared to tubes 3 – 5.

To examine the digestion of protein by pepsin, 5 tube were prepared with different combination : Egg cube, Pepsin, HCL, Amylase. Firstly cube of white part of egg is added to all 5 tubes, 2 ml of water in tube 1, 2 ml of pepsin in tube 2,3 and 4, 2ml of amylase in tube 5,2 ml of HCL in tube 2 and 4, Incubate 30-60 minutes tube 2 at room temperature remaining in warm water.

To examine the digestion of starch by salivary amylase, 4 tubes were prepared with different composition : Water, Amylase, Pepsin, Starch solution. Firstly 2ml of starch solution was added in tube 1,2,3,4. After 20 drops of water, 20 drops of amylase, 20 drops of boiled amylase, 20 drops of pepsin were added in tube 1,2,3,4 respectively. Than we put them in warm water and incubated for some time.

To examine the digestion of fat by lipase, 4 tubes were prepared with different composition L lipid cream, water, bile salt, lipase, amylase. Lipid cream was added in tube 1,2,3,4. Water and bile salt was added in tube. Lipase was added in tube 2, Lipase and bile salt was added in tube 3, Amulase was added in tube 4. After we observed color changing.

In conclusion these experiment show that the amylase does not breakdown the glucose, carbohydrates and cellulose but have instead breakdown the reduction sugar.

Conclusion

The gastrointestinal tract is the longest system in the human body. And at every stage, on every "floor" of our uninterruptedly working "digestive plant", everything is weighed and subordinated to strict laws of proportionality and harmony. It remains for us not to interfere with the natural order and, in accordance with the internal clock, take food on time.

Work Cites

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