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Anatomy and Physiology II

STEAM PROJECT: The Steps of the Disgetive System

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STEAM Project Abstract

For my STEAM project I decided to do it on the digestive system and the route food takes from the mouth to anus. I made a semi scale model of route food takes from the time it enters our mouth until the time we excrete it from our bodies. I demonstrate this using food dye and water (to simulate food ingestion) as I pour the “food” into the mouth. We can see the fluid move throughout the digestive system until it pours out into the glass. The digestive system consists of the gastrointestinal tract (GI tract) and the accessory organs of digestion. The accessory organs consist of the mouth, teeth, esophagus, tongue, salivary glands, pancreas, liver, and gallbladder. Digestion involves the breakdown of food into smaller and smaller components, until the time in which it can be absorbed and eliminated from the body.

The Steps of the Digestive System

“The first step of the digestive process occurs before food even enters your mouth. Once you smell or see food that you plan to eat, you begin to salivate, and the digestive process begins.” (Sheehan, 2021) As soon we put food into our mouths, our teeth will begin to start breaking that food apart. This act is called chewing and is going to be start to mechanical digestion. As we chew, the saliva then begins to mix with the food. Saliva has many roles. It helps us start breaking down the chemicals in the food. This action is a form of chemical digestion. Moreover, it helps lead to the next stage in digestion which is propulsion.  This refers to two acts, which is swallowing and peristalsis. Food once in more manageable pieces, the tongue pushes the food to the back of the throat and into the opening of the esophagus, it is propelled down the esophagus. “Muscles in the wall of your esophagus create synchronized waves — one after another — that propel the food into your stomach. In this process, called peristalsis, muscles behind the bolus of food contract, squeezing it forward, while muscles ahead of it relax, allowing it to advance without resistance” (Slide show: See how your digestive system works. 2020) When food reaches the lower end of our esophagus, pressure from the food signals a muscular valve in the lower esophageal sphincter to relax. This allows the food to enter our stomach. The stomach will continue to use both mechanical and chemical digestion to help break down food. “Acidic gastric juices that chemically break down the food and help kill any bacteria or dangerous microorganisms that entered the stomach with the food.” The stomach uses both mechanical and chemical digestion continue to occur. (Sheehan, 2021) The muscles surrounding the stomach provides mechanical digestion as they churn and mix all of the contents together that is in the stomach. Once this process has finished, which usually taking three to five hours, “The stomach slowly empties its contents, called chyme, into your small intestine.” (Your Digestive System & How it Works. 2017) In the upper section of your small intestine, which is called the duodenum, the chyme passes by the liver and gallbladder, bile will mix in with the contents. Bile is made in the liver but is secreted and stored by the gallbladder.  “Bile helps digest fat particles in the food, breaking them down into small droplets. The pancreas then releases a digestive chemical to help with the digestion of carbohydrates and proteins.” (Sheehan, 2021) Once all of the contents and digestive chemicals move through the small intestine, this will be when we absorb most of the nutrients. The food particles are finally breakdown and small enough that the nutrients from the food can be absorbed into the bloodstream. There are absorbed by the thousands of small blood vessels that line the surfaces of the small intestine. These absorb the digested nutrients are sent through via blood circulation directly to the liver. Where the liver will process and distribute nutrients to the rest of the body. After making its way through the entire small intestine, This is where all of the unused food particles will enter the large intestine. The large intestine is responsible for absorbing all the water from the remaining particles and absorbed back into our bloodstream. Everything that still remains once it leaves the large intestines will be removed from the body. All remaining particles is then sent to the rectum for excretion from the body. Which is what we call feces. Where we will expel the feces through are anus.

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