Examination Of The Bodily And Enzymatic Processes: Osmosis Transpiration Within The Membrane And Body

With nutrients being consumed daily by individuals, this lab serves to inform one of the processes of osmosis and diffusion when digested, as well as detecting the nutrient that will result in either process. Due to the human viewing the objective, they must be informed of the processes that occur within their bodies, hence the usage of a semi-permeable membrane and substances to determine the process. The processes must be acknowledged as well as the functions of nutrients within the body and its enzymes.

Although one may acknowledge both processes via experimentation, much of the osmosis and diffusion occurs within the cell membranes within plants and animals (Felten et.al.2). Both processes depend on the movement of solutes and solvents. Within Osmosis, solvents, in this case, water, attempt to pass through a membrane with solutes that are low and high in density. Diffusion is the process in which solutes that are of high density spread out to the solvents of lower density. For example: when water is applied to a dishwashing sponge, the water is absorbed as the sponge is of higher concentration and the water is lower. Since essential oil diffusers are utilized currently, the oil and water combination that is of high concentration, is converted into low concentrated vapor. Through these examples, both processes are distinct as osmosis is concerned with the absorption of a liquid, and diffusion, in turn, emphasizes the substance's interaction with a liquid. Within this lab, the process of both osmosis and diffusion will be determined via observing substances that may or may not pass through a semi-permeable membrane (Felten et.al 2). I believe that osmosis will occur due to the iodine interacting with the nutrients in the semi-permeable membrane.

Due to the detection of nutrients that will be executed via experimentation, it is vital for one to acknowledge the essential nutrients that the human cannot produce for bodily functioning and growth. These nutrients consist of: Carbohydrates, Lipids, Proteins, Vitamins, Minerals, and Water (Felten et.al. 5). According to Smith et al., the six macronutrients serve distinct purposes: carbohydrates are most present within the forms of starches and sugars and serves as the most vital sources for ones' caloric needs. Lipids, which are found in the forms of solid fats and liquid oils, provide energy for the body, maintain the homeostasis of blood pressure, and repair cells as well. Proteins are formed by amino acids and serve to maintain and strengthen the bones and muscle within the human body's structure. Much of the protein consumed by humans is found within animal and plant sources, like lipids. Although they do not provide calories, vitamins condone the body to interact with bodily chemicals and assist other nutrients by proving energy to them to function properly. However, two types of vitamins exist, fat-soluble (A, D, E, K) and water-soluble (B, C), which all serve distinct functions. Like vitamins, minerals also serve two functions: within the cell processes and assist in the functioning other nutrients for distinct body parts, tissue in particular. Despite the nutrients discussed serving functions in the body, water is essential for all of the bodily, chemical, and cellular processes, as it serves as a lubricant. Water may be obtained by multiple plant foods and itself, yet, must be potable for proper functioning. (Smith et. al. Chapter 1 Section 1.3).

Since multiple individuals are unaware of what they are consuming which may impact their mental, physical, and emotional health, this lab will inform students of the nutrients present in

common foods via assays. (Felten et al. 5). I believe that the unknown element tested is carbohydrates found via iodine detection due to its presence in common foods and beverages.

Results

In preparation for the potential osmosis and diffusion, glucose within the water was tested via using a Glucose Testing Strip. According to Felten et.al., glucose is present within water is the strip color is green (Felten et. al. 2). After testing the water, the strip was yellow, meaning that glucose is not present.

After the membrane that contains starch and glucose was inserted into the Lugol's Solution for thirty minutes, the membrane separated into two colors. The top was dark purple, and the bottom was clear. As for the water in the cup, the water was converted from clear to a light-yellow color, resembling the color of beer. Observing the separation of colors, the iodine (Lugol's Solution) diffused into the membrane as it reacted with the glucose and resulted in a change of color. As for the starch, although it resided in the membrane, it was diffused into the cup's contents due to its interaction with iodine. Since the water was tested an additional time after the experiment, the strip color changed to a green color, therefore, glucose was diffused from the membrane into the cup's contents. After measuring the level of water within the cup, its level remained constant, thus, it did not diffuse into the membrane. If water were to diffuse, the water level would be reduced. Since water, which is of a low solute concentration, did not diffuse into the membrane with high solute concentration, the osmosis process occurred.

With the nutrients attempting to enter the membrane, the interaction of the membrane and the iodine, released solely glucose as a result. Since starch was present within the membrane as well, it did not diffuse from the membrane, like water.

Conclusion

Since the unknown substance is to be discovered, the substance reacted to both copper ion and iodine. Copper ion is the detection element for simple sugars and iodine is the detection element for carbohydrates (Mohsin slide 16). With simple sugars being a form of carbohydrates, the unknown substance is, therefore, carbohydrates. Although much of the test tubes have yet to react to elements to determine the presence of nutrients. A tube in which the result is acknowledged but has yet to discover the result for the variable is referred to as a control. In contrast, a variable is the tested and hypothesized factor for an experiment (Mohsin slide 14). With a reaction awaiting within the usage of test tubes, such tubes are utilized to compare to each other. For example, within this experiment, an unknown substance was to be determined within nutrient groups. This was executed by comparing the three tubes in each nutrient group and observing the color density. If a color was dense for the unknown substance, then that is the nutrient within the substance.

Illustration

According to the illustration, the water level remained the same after the insertion of the membrane due to the absence of water within it. Since iodine was incorporated into the water, the substance converted the water from clear to a dark yellow color that resembles the color of beer. The iodine interacted with the substances within the membrane which resulted in a color

binary and changed the color of the water as result. Although the glucose resided within the membrane, it was the only substance that was released into the water, thus indicating that it is permeable like the iodine. Like the water, starch was impermeable as well as it resided within the membrane and the strip color was green. Had starch been permeable, the strip would have resulted in a light shade of green and/or with an additional color.

Discussion

Although identifying the process of osmosis and diffusion was demonstrated within an observable method. This experiment serves to assist one in acknowledging the processes that occur subjectively within the bodily and chemical processes via a sample. Since the processes are acknowledged after the experiment, they must be applied into the contexts of the nutrients within the body. The processes of osmosis and digestion transpire once a nutrient enters the body and within its digestion and absorption.

Since the process of osmosis and diffusion was to be determined within the experiment, identifying the processes requires one to acknowledge the characteristics of each process. According to Sarah Moore, the process of osmosis pertains to the migration of water (solvent) through a semi-permeable membrane from a low to high concentration of solute (membrane substances). Diffusion pertains to the movement of particles from a high to low concentration (Blue). With equilibrium of the liquid attempted to be obtained, the process of osmosis occurred within the experiment, as the membrane changed and separated color due to the iodine-contained water, of low-solute concentration, interacting with the high-concentrated solutes. Since the process of osmosis occurred, I hypothesized correctly. However, due to the water level in the cup remaining constant, solely the iodine interacted with the solutes as opposed to the water passing through. Since the high-concentrated solutes refrained from releasing into the water, it is evident that the process of diffusion did not transpire.

Due to the change in colors that occurred within testing the samples for simple sugars and carbohydrates, the unknown substance is carbohydrates. Since the samples for every nutrient reacted, it was difficult to determine the nutrient. However, since some colors were dense and others light for the unknown substance; a drastic reaction was evident within the dense colors. Prior to the experiment, I claimed that the unknown substance would be carbohydrates, as it is found in many foods and beverages. According to the comparison of the samples, I hypothesized correctly. An evident indicator that the presence of carbohydrates was present is the contrast between two colors, like the starch and glucose after its interaction with iodine; a dense color binary.

Since the experiment gave one information regarding osmosis and diffusion, it must be applied within the context of the body. These processes transpire when nutrients, that sustain humans, are consumed. According to Smith et.al., within the digestion of proteins, pepsin digests into the stomach through gastrin and hydrochloric acid which break polypeptides into petit amino acid chains which release acid. In the small intestine, the digested protein is converted into chyme, releasing CCK into the pancreas via the bloodstream and digested as amino acids to the liver, which then tailors to body tissues (Smith et.al. Chapter 6 Section 6.4). Within the processes of broken amino acids traveling to the liver, osmosis transpires, as low concentrated CCK solutes pass through small intestine walls, leading into the bloodstream of high concentration.

Within the digestion of carbohydrates, Smith et.al. claims that starch combines with salivary amylase when digested mechanically and is transported into the esophagus and into the stomach where amylase is dismantled by its acid. Prior to entering the small intestine, starch is converted into maltose in which the pancreatic amylase condones the digestion of starch in the small intestine walls, where disaccharides are converted into monosaccharides and taken to the liver to be converted into glucose and diffuse into the bloodstream (Smith et.al. Chapter 4 Section 4.4). Since the diffusion of nutrients within the bloodstream initiate the functioning of the body, the diffusion process occurs due to glucose's direct entry into the bloodstream; the highly concentrated substance is released into a lower concentration.

Once lipids are consumed, its digestion process transpires uniquely. According to Smith et. al., within lipid digestion, lipase is released within the stomach and migrates to the liver in which bile, which enacts emulsification, is produced and stores into the gallbladder. Next, the bile is released into the small intestine via the bile duct, and within the small intestine, enzymes that are stored in the pancreas and convert triglycerides into monoglycerides. Since fatty acid chains vary in length, regularly sized flow into the bloodstream via the portal vein, small chains store in the portal circulation, and extensive chains convert into triglycerides and store in the lymphatic system (Smith et.al. Chapter 5 Section 5.4). With the nutrients that have underwent bodily and enzymatic processes, many nutrients have accumulated and developed density. Since these nutrients must undergo transportation, the process of diffusion would transpire. According to Becker, due to blood possessing a low concentration, the dense nutrients must convert from a high concentration to a low concentration into the blood stream (Becker). Within the context of lipid digestion, the process of diffusion occurs within the small intestine when regular sized chains of fatty acids flow into the blood stream as highly concentrated nutrients must pass through a low concentrated bloodstream.

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