Passive and active transport

Though exceptionally minute, cells are the most vital unit that is essential for some processes to occur within the body. These processes are very important in the development and growth may it of a plant or an animal. It is very important that the growth and development is accompanied by various unique mechanisms in order for them to become more successful. These mechanisms assist in the transportation of chemicals, nutrients and chemical substances with the different cells in both the plant and animal (Alberts, 2010). In order to understand to understand transport within the cells, it is important that one carefully understand the importance of cells in the transportation. All living objects whether plants or animals are made up of cells. Cells are made up of atoms which are defined as the smallest unit of matter. Within a cell there is a cell membrane which plays a major role in the transportation of substances in and out of the cell. It normally surrounds, protects and holds all the contents found within the cell (Stephen, 2007). Molecules are known to pass in and out the cell membrane. The transportation of substances in and out the cell is enabled through two mechanisms i. e. the active transportation and the passive transportation. Active transportActive transport is defined as the movement of nutrients and chemical substances alongside the concentration gradient. It is called active because it consist one essential component and that it mostly involve the use of energy. This energy used in active transportation is collectively used by the cells in the form of adenosine triphosphate (ATP). Adenosine triphosphate is very essential in the transportation of most of the substances both inside and outside the cellular membrane. Stephen (2007) observes that diffusion is found to be powerful within cells such that there are powerful movements of materials in opposite directions alongside the

concentration gradient. Minute ions or molecules across the cell membrane are gradually carried out through the transportation of proteins found within the cell membrane it self. Larger molecules and ions are transported actively transversely along the cell membrane through the processes known as endocytosis and exocytosis. Transportation of larger molecules may gradually cause the changing in shape of the cell membrane. Active transportation can be defined by the use of easy language as the movement of nutrients and chemical substances from a region of low concentration to a region of high concentration. There are two types of active transport i. e. primary active transport and secondary active transport. Primary active transport involves the use of adenosine triphosphate in the transportation of glucose and amino acids across the cell membrane whereas secondary active transport involves the continuous use of electrochemical slope. A good example of an active transport is the transportation of sodium ions Na+ out of a cell and potassium ions K+ inside the cell by the use of sodium potassium pump (Lodish, 1995). Passive transportationPassive transportation is the movement of nutrients and molecules through the use of innate permeability within the cell membrane. Its two main components involve the transportation of proteins and lipids. It also can be defined as the transportation of molecular or atomic and moving biochemical substances across the cell membrane. It does not involve any form of chemical energy during transportation (Difference Between, 2010). There are four main types of passive transportation i. e. " osmosis, diffusion, filtration and facilitated diffusion", (Stephen, 2007). Osmosis is the transportation of water molecules through a moderately permeable cell membrane from a solution of high concentration to that of lower concentration. Factors such as pressure assist

in the movement of water molecules. Diffusion is the general movement of substances from an environment of higher concentration to an environment of lower concentration. Diffusion tends to take place until there is no concentration gradient. Facilitated diffusion is the movement of large molecules across the cell membrane through the use of proteins which normally embed within the membrane of the cell. A good example of facilitated diffusion is the exchange of carbon dioxide CO2 and oxygen O2 in the alveoli found in the lungs (Alberts, 2010). Filtration is the transportation of water and solute molecules through the cell membrane by the use of the cardiovascular pressure. The size of pores found in the membranes often dictates the kind of molecule that will pass through it. The differences between active and passive transportation in a cellAlthough both active and passive transportation are important mechanism within the bodies, there are many differences found between the two types of transportation. The differences between the active and the passive transportation are characterized through the concentration gradient, protein and the energy consumed. The difference due to concentration gradientBetween the two mechanisms there are great differences in their concentration gradients. It is very clear that the concentrations of substances which are divided by a cell membrane are comparatively different. It is well known that inside a cell there is a greater concentration gradient as compared to outside where there is less concentration gradient. This is not always the case the concentration can vary both inside and outside due biological factors (Stephen, 2007). In active concentration there is a tendency of movement of substances against the concentration gradient. For instance, when a cell want to transport molecules towards it self (the cell appears to be in a region

of high concentration) it requires a lot of energy for its sodium potassium pump to function and transport the substances. Difference Between (2010) asserts that unlike in the active transport, passive transportation involves the movement of substances along the concentration gradient. In this mechanism, the cell realizes that molecules and ions can be transferred from one side to the other side due to its favorable concentration being displayed. Due to the favorable concentration gradients being displayed the cell no longer needs any form of energy to transport substances. The use of favorable concentration gradients refers to condition that follows the normal rules of diffusion. It has been found that when substances that are in a more concentrated internal environment and need to be transported in an outside environment which happens to be less concentrated, then substances will have an easy out flow. Difference due to energyThe use of energy in the transportation is very important since it enhances quick movement of substances in and out the cell. In active transportation there his great usage of energy in the movement of substances from a low concentration region to a region where there is soaring concentration. This energy used in active transportation is collectively used by the cells in the form of adenosine triphosphate (ATP). Adenosine triphosphate is a form of chemical energy especially used in the primary active transportation. Adenosine triphosphate is very essential in the transportation of most of the substances both inside and outside the cellular membrane (Difference Between, 2010). Most of energy used by the cell during active transportation is directly used to force out ions out of the cells across the membrane found in the plasma. Ions are known to have electric charge which does not normally pass easily across the cell membranes. The probable energy of the concentration gradient

ensure that enough adenosine triphosphate is produce and effectively assist in the movement of different molecules across the cell membrane. In passive transportation with the cell, there is great reliance of instinctive permeability within the cell membrane and the components of lipids and proteins transportation of substances. Permeability is in a membrane is the ease in the passage of molecules in and out of the cell. It mainly depends on the usage of electric charge and lesser level of the molar mass found in a molecule. Charged molecules can fail to pass through membrane due to pH parturition of nutrients throughout the fluid compartments within the body system. Difference in the protein involvementThere is great involvement of a certain kind of protein that enhances movement of substances in active transport as compared to passive transportation where no protein is required (Doherty & McMahon, 2008). The movement of substances in and out of the cell membrane is facilitated by the concentration gradient found between the partitioned sides of the cell membrane. In order for one to understand clearly the function of the cell and what is contained both in a plant and animal cell. The cell membrane consist of various biological molecules mainly the lipid and the proteins. Although it is known that the concentration of the components of a membrane in the aqueous condition is low therefore, there is exchange of molecules connecting the lipids and the aqueous status. Other than the differences found between the two mechanisms, it is important that one understand the similarity between them so as to fully understand transportation within the cell. Both mechanisms assist in the movement of various substances across the cell membrane. Another similarity between them is that there are different concentrations found on the different sides of the membrane. It is very clear that both active and

passive transportation play an essential part in the movement of substances in and out the cell membrane.