# Free research paper on anatomy and physiology

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Anatomy deals with the study of forms and body structures (both internal and external) along different levels of organization such as molecules, cells, tissues, organs and organ system. These forms and body structures performs a corresponding function which is responsible for the growth and development of an organism. The study that deals “ with the patterns and processes through which the body functions in its environment” is known as physiology (Starr, Evers and Starr, 2008). Physiology is essential in understanding how anatomical structures perform individual and group task related to the activities of the body. For instance, one segment of the human body in the organ system level is the digestive system. The digestive system consists of various organs with specific functions (i. e. the liver secretes bile to digest fats ingested in the body) which collective works together for the purpose of digestion. Anatomy is required to accurately describe the process of digestion. That is which specific structure is responsible in the digestion of fats. Certain anatomical terms used to pinpoint the location of a particular structure include posterior (i. e. toward the back of the body) and anterior (i. e. toward the front of the body). To illustrate, the shell of a turtle is made of two parts--carapace and the plastron. The carapace is posterior to the plastron. Eight neural plates are found in the median (middle part or the midline section) section of the carapace and lateral (away from the midline) to the neural plate are 8 costal plates (Hirasawa, Nagashima and Kuratani, 2013).

## Homeostasis: Positive and Negative Feedback Mechanisms

Homeostasis is the state where an internal environment is maintained within the limits of tolerance of a cell. Cell receptors respond to various stimuli and

make the necessary adjustments to maintain a steady-state condition. There are two major feedback mechanisms which governs homeostasis in the body —the positive and the negative feedback mechanisms. Positive feedback mechanisms trigger a series of events which further intensifies the change that has been made from an original condition. Usually, positive feedback mechanisms are linked to system instability. The negative feedback mechanism operates in such a way that a reverse response to the changes beyond the threshold point within the original condition is made (Starr, Evers, and Star, 2008). Negative feedback mechanism is best illustrated in the process of thermoregulation. However, when a positive feedback is used for thermoregulation, it will further cause severe damage to the human body given that the body needs to maintain an optimum body temperature of 37 °C. Thus, when an individual has a fever, the natural response is to lower the temperature to steady-state condition. But in the case of a positive feedback the temperature will further increase and the condition is exacerbated.

pH and its Functions

The pH is a parameter that is commonly used to measure the acidity or basicity of fluids. In the pH scale 7 is marked as neutral while below 7 is considered acidic and above 7 is considered basic. All of our body fluids do not have the same pH the pH of the human blood ranges from 7. 35-7. 45 while the gastric juice in the stomach ranges from 1. 5-3. 5. Such pH in the human body fluids varies because of the differences in the requirements of the body units to carry out various processes. During digestion, the pH of the stomach must be at 1. 5-3. 5 so that the food could be easily broken down into smaller chemical subunits which will be distributed to the different parts

of the body (Starr, Evers and Starr, 2008). Enzymes are large protein molecules that act as a catalyst to carry out specific processes for the body to maintain homeostasis (Starr, Evers and Star, 2008; Voet and Voet, 2011). Enzymes are sensitive to pH. Voet and Voet (2011) explained that most proteins are only active at a narrow pH range of 5-9. Beyond this pH range is where protein denaturation most likely to occur. Thus, when this happens, the catalytic activity to synthesize ATP for instance which is required by the body for survival seizes and this will lead to the impairment of the body systems.

## The Plasma Membrane and Cell Transport

The plasma membrane is made up of phospholipid bilayer and in between these layers are proteins embedded (Starr, Evers and Starr, 2008). This lipid bilayer has a polar and nonpolar end, which makes the cell selectively permeable to chemical substances. The nonpolar end of the phospholipid bilayer allows gases and other small nonpolar molecules to enter the cell. Water molecules being polar, can only cross the plasma membrane when the hydrophobic end of the layer allows a small gap to open. Other molecules that cannot pass freely with the plasma membrane are transported via active and passive transport systems. Substances both diffuse in active and passive transport, however, in active transport, solutes move across the membranes against a gradient. In passive transport however, solutes move by simple diffusion along the channel and this requires no energy input in contrast to active transport (Starr, Evers and Star, 2008.

## Cell Organelles

Mitochondria are responsible in the energy synthesis of the cell in the form of ATP. Energy is used to perform bodily functions required for survival. According to Detmer and Chan (2007), the “ shape of mitochondria, fusion and fission” are very important in maintaining and carrying out the functional properties of the organelle to include its capacity for respiration. The authors also noted that such defects in mitochondria may cause a significant effect to the growth and development of organisms such as neurodegenerative diseases.

Ribosomes consist of nucleic acid and protein. The main function of ribosomes is protein synthesis where amino acids are bind together to form large protein molecules that are essential to carry out processes in the body systems. The study of Ding, Markesbery, Chen, Li and Keller (2005) illustrated that such errors in protein synthesis can have deleterious effects to cells within the nervous system causing one of the many debilitating disorders in our body such as the development of Alzheimer’s disease.

The genetic information of our body structure is basically stored in the DNA. That is, the eye color or the shape of the nose of an individual is determined by the information that the DNA holds. When DNA is impaired, such attempts to continue the process of replication can lead to mutation or even cell death. In certain studies mutation has been reported to be linked to cancer according to Marnett (2000).

The receptors of the plasma membrane are vital to carry out cell communication and self-recognition functions of the cell. Receptors send and receive signal to the brain. For instance the body is stimulated when

touching hot objects. The stimuli are carried to the brain in the form of signal via receptors. The brain then processes these signals and then eventually sends signals back to receptors so that the body could respond to stimuli. Impairments in the receptors signaling function has been attributed to damage in DNA due to oxidative stress. This damage to receptors impedes the cells to carry out signals and perform its function. As one of the many consequences of damage receptors, it was elucidated in the report of Jiang, Pagadala, Miller and Steinle (2013) that reduced insulin signaling results to high glucose concentrations in the body.

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