

Homeostasis
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Homeostasis

Explain why homeostasis is the maintenance of a dynamic range of environmental qualities rather than holding the internal environment at a set point

Living organism survives in changing conditions in the environment due to the process of homeostasis. Hence, such a process is very significant; the body requires it for the proper functioning (Cherif, Jedlicka, Al-Arabi, Aron, & Verma, 2010). It is responsible for keeping in balance all fluids and the temperature in the body of organisms for the body cells to function in the required environment, hence, it involves both physiological and chemical process in the body, and it's an automatic process that brings vital systems of the body back to normal. It, therefore, helps in keeping the temperature constant in the following ways;

The internal bodies of living organisms keep changing as a result of different factors. The amount of water consumed by an individual determines the level of water in the body which either increases or decreases making the water levels in the body of a person change from time to time (Cherif 2010). The internal body temperatures of a person also keep changing at a specific range, it means that the body temperature of organisms is never stable. Therefore, homeostasis becomes the only process during which the body takes to respond to these changes.

In contrary, the body temperature and water levels in the body of organisms vary according to the level of activities undertaken. For example, running during cold morning changes the body temperature. After running, a person feels warmer. Thus, the body temperature is higher with the sweat coming out of this person. During this process the amount of water in the body is significantly reduced. To sum up, water levels in the body keep on changing, thus, making homeostasis the only means with the help of which the body can use to attain the changes for the well-being.

What would be wrong with a set point, rather than working with a range of values?

Firstly, working with a set point of temperature is not favorable and is wrong because in reality, the body temperature of any organism is never static and there are always changes occurring in their bodies. Hence, such changes help in adaptation of fitting in a particular environmental situation. In addition, bodies of organisms are responsive to external stimuli and internal stimuli, whereby all these responses are associated with the changes in the body temperature. That is why a body has different adaptation features to encounter such stimuli for survival.

In reality, human beings always undergo various changes; hence, we cannot assume that it works in a set point. Therefore, it gives the range of values at all times when measured. For example, when a person wakes up in the morning to take a shower, one will not expect the body temperature to remain the same as when the person was sleeping. The body temperature changes in a particular range between the moment of waking up and getting out for the shower

Examples of hormones that play major roles in homeostatic processes in the body

Different hormones that help in the process of homeostasis are secreted by the endocrine system, which includes pancreas with the main function of regulating the processes in the body. The hormones are responsible for regulating some of the processes in the organisms (Cherif 2010). One of the hormones is insulin. It is secreted by pancreatic glands which are responsible for regulating the glucose level in the body of organisms. The other hormone is antidiuretic hormone (ADH), which is secreted by the hypothalamus, and it is responsible for regulating and balancing of water in the body.

What happens if insulin and antidiuretic hormone are disrupted in their actions?

Insulin is a hormone that deals with the regulation of the amount of sugar and glucose in the blood of human beings. It also consists of glucagon, which works oppositely to ensure that blood sugar levels do not get too high, or low, hence, making sure that cells receive enough glucose to use as energy. Therefore, interruption of insulin hormone will lead to the imbalance

of the blood sugar, which can subject an individual to diseases such as diabetes. That is in normal functioning when blood sugar is low, and the pancreases secrete glucagon that makes the liver release glucose in the bloodstream. Hence, interruption means that there will be interferences in sugar levels in the blood.

Antidiuretic hormone (ADH) balances the level of water in the body. Disruption of such hormones, on the one hand, may cause the kidneys to retain more water in the body, diluting the blood; hence, due to low salt concentration in the bloodstream a person can be at risk of getting cancer. On the other hand, it can cause the kidneys to excrete more water, which increases the amount of urine, hence dehydrating the body.

How maintaining homeostasis gives us greater freedom of activity of external dependence environment.

Homeostasis is primarily concerned with stabilizing internal metabolic reactions in the external environment. Hence, the ability to carry out homeostasis provides an organism with a lot of freedom from dependence on the external environment (Cherif 2010). For example, human beings are warm-blooded, it regulates our body temperature; also we have hair on our bodies so that the body controls the temperature, for example when it's too hot, the blood vessels of human beings undergo vasodilation while the hair on the lays flat on the body. When it is too cold, the blood vessels undergo vasoconstriction while the hair stands on the body. All this has a purpose to regulate the body temperature.

What happens during extremes that force our bodies out of homeostatic bounds?

Give specific examples

In most cases, the extreme conditions which our bodies are exposed to sometimes force our bodies to move out of the homeostatic process. It mostly occurs when the requirements of our bodies are not satisfied, which leads to the more significant imbalances in the maintenance of homeostatic processes in the bodies.

The examples include, when the body of an individual is shocked, the situation causes the body of individuals to become weak. This increases the heartbeat rate of the individual beyond ordinary, which can subject such individuals to heart-related diseases such as heart disease and low blood pressure (Cherif 2010). The skin of such individual will also become cold due to the imbalance of homeostasis in controlling the temperature of the body. That means that the hormones will not be secreted by the glands to perform specific functions.

Also, when starving, the glycogen in the body becomes depleted. The continued absence of food subjects the body to starving, breaking down the available proteins that are stored in the muscles into glucose to provide energy. Hence, the whole body of an individual begins to weaken, making one to look emaciated. If one continues starving without pre-feeding, such condition can result in death as there is no source of energy for the body to utilize.

Why maintenance of homeostasis is essential during the development of new humans within the bodies of their mothers.

Maintenance of homeostasis is crucial and especially when it comes to pregnant women. This is because the developing babies need more nutrients for growth; hence, it's a requirement that such expectant mothers can supply the nutrients to them and their blood. Therefore, maintenance of homeostasis makes it possible for the blood levels and nutrients to be balanced and exchanged between the mother and the baby. Once the imbalance of homeostasis occurs in the body of a pregnant mother, it hinders the essential nutrients from reaching the baby, which can lead to death, and even the conceived baby may be underweight.

What can go wrong if specific homeostatic functions are disrupted?

Homeostasis is necessary for general body functioning. All chemical reactions and metabolic processes take place slowly because there is a maintenance in homeostasis. In most of the times, the imbalances occur when there are differences in the feedback mechanisms. Thus, they disrupt the homeostatic level, which later subjects our bodies to potential illness.

Fatigue in most cases is a common factor which is characterized by an increase in the temperatures of the body, and if there is no medical treatment, such conditions may result in death. In addition, diabetes, heart failure, and hypertension are the common diseases associated with disruption of homeostatic functions.

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References

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