

## Importance of Homeostasis in Human Physiology

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## DESCRIPTION

Homeostasis is a fundamental process that maintains a relatively stable internal environment in humans, despite changes in the external environment. It is a dynamic equilibrium that involves several physiological and biochemical mechanisms that work together to maintain the body's functions within normal limits. This process is essential for human survival, and it is a continuous process that occurs at every moment of our lives. The human body has several systems that are responsible for maintaining homeostasis. These systems include the nervous system, the endocrine system, and the immune system, among others. The nervous system is responsible for transmitting signals to various parts of the body, while the endocrine system secretes hormones that regulate various physiological processes. The immune system protects the body against pathogens and other harmful substances.

The human body maintains homeostasis through several mechanisms. One of these mechanisms is negative feedback. Negative feedback is a process in which a deviation from the normal range triggers a response that counteracts the deviation and restores the normal range. For example, when blood sugar levels rise above the normal range, the pancreas secretes insulin, which facilitates the uptake of glucose by cells, thereby reducing blood sugar levels.

Another mechanism involved in this process is positive feedback. Positive feedback is a process in which a deviation from the normal range triggers a response that amplifies the deviation, leading to a further deviation from the normal range. Although less common than negative feedback, positive feedback is still an essential mechanism of homeostasis. An example of positive feedback is the process of blood clotting. When a blood vessel is damaged, platelets aggregate at the site of the injury, and the release of clotting factors triggers a cascade of reactions that ultimately leads to the formation of a blood clot, which seals the wound.

The maintenance of homeostasis in humans is essential for several reasons. Firstly, homeostasis ensures that the body's cells receive a constant supply of oxygen, nutrients, and other essential substances. Secondly, it ensures that the body's pH, temperature, and fluid balance are within the normal range and enables the body to respond to changes in the external environment, such as changes in temperature or the presence of pathogens.

One of the most critical systems involved is the cardiovascular system. The cardiovascular system comprises the heart, blood vessels, and blood. The heart pumps blood throughout the body, while the blood vessels transport blood to the body's organs and tissues. The blood carries nutrients, oxygen, hormones, and other essential substances to the body's cells and removes waste products. The cardiovascular system maintains homeostasis through several mechanisms. One of these mechanisms is the regulation of blood pressure. Blood pressure is the force exerted by the blood against the walls of the blood vessels. High blood pressure can damage the blood vessels and increase the risk of cardiovascular disease. The cardiovascular system regulates blood pressure through several mechanisms, including the constriction and dilation of blood vessels and the release of hormones such as angiotensin II. Another critical mechanism in the cardiovascular system is the regulation of blood flow. Blood flow refers to the volume of blood that flows through a particular organ or tissue per unit time. The cardiovascular system regulates blood flow by adjusting the diameter of the blood vessels and the rate at which the heart pumps blood. This mechanism ensures that each organ and tissue receives a sufficient supply of blood and oxygen.

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