

HOMEOSTASIS

Maxmatkulova Guzalya Mashrapovna

219 group student of the Medical Treatment Faculty
Samarkand State Medical Institute, Uzbekistan,

Abstract.

This paper work about homeostasis is represented as a relative constancy of the internal environment which the, in cells, tissues, biological fluids, hormones, enzymes, metabolites continuously change. At the same time, system analysis and synthesis allow searching for variants of external control of such complex systems.

Key words:

Homeostasis, information, control in living systems, pain homeostasis

An organism can be defined as a physicochemical system that exists in the environment in a stationary state. It is this ability of living systems to maintain a stationary state in a continuously changing environment that determines their survival. To ensure a steady state in all organisms - from the morphologically simplest to the most complex - a variety of anatomical, physiological and behavioral adaptations have been developed, serving one purpose - maintaining the constancy of the internal environment.

For the first time, the idea that the constancy of the internal environment provides optimal conditions for the life and reproduction of organisms was expressed in 1857 by the French physiologist Claude Bernard. Throughout his scientific career, Claude Bernard was struck by the ability of organisms to regulate and maintain within fairly narrow limits such physiological parameters as body temperature or water content in it. He summarized this idea of self-regulation as the basis of physiological stability in the form of a statement that has become a classic: "The constancy of the internal environment is a prerequisite for a free life."

"Pain homeostasis" is an equilibrium state between pain and anti-pain signals, both nervous and chemical (substance P and endorphins). In whatever direction this balance moves, a force immediately appears acting in the opposite direction (Tepperman J., Tepperman H. Physiology of metabolism and the endocrine system. Introductory course: Translated from English. - M.: Mir, 1989. - 656 s.). The painful withdrawal of drug addicts vividly illustrates this thesis about pain homeostasis. The variable permeability of the renal tubular membranes controls the upper concentration limit for many substances dissolved in the blood. For example, with an artificial increase in their concentration in the body, the kidneys increase their excretion from the blood into the urine by increasing the permeability of the tubular membranes to them. In general, membrane permeability in the kidneys ensures that the upper limit of the concentration constants of many blood substances is maintained. The endocrine glands control the value of homeostatic constants and ensure their maintenance within specified limits. In particular, a system for hormonal regulation of blood glucose concentration by insulin and glucagon secreted by the pancreas in response to a change in the "glucose homeostatic constant" is well known.

Homeostasis (Greek homoios - similar, the same; stasis-state, immobility) - the relative dynamic constancy of the internal environment (blood, lymph, tissue fluid) and the stability of the main physiological functions (blood circulation, respiration, thermoregulation, metabolism, etc.) of the human and animal organism. Regulatory mechanisms that maintain the physiological state or properties of cells, organs and systems of the whole organism at an optimal level are called homeostatic. Historically and genetically, the concept of homeostasis has biological and medico-biological prerequisites. There it is correlated as a final process, a period of life with a separate, isolated organism or a human individual as a purely biological phenomenon. The finiteness of existence and the need to fulfill one's destiny - the reproduction of one's own kind - make it possible

to determine the survival strategy of an individual organism through the concept of "preservation". "Preservation of structural and functional stability" is the essence of any homeostasis controlled by a homeostat or self-regulating.

Previously, it was believed that the main factor determining the magnitude of the osmotic pressure of the extracellular fluid is the sodium concentration, however, later studies have shown that there is no close correlation between the sodium content in blood plasma and the value of the total osmotic pressure in pathology. The exception is plasma hypertension. Consequently, carrying out homeostatic therapy by introducing glucose-saline solutions requires monitoring not only the sodium content in serum or plasma, but also changes in the total osmolarity of the extracellular fluid. The concentration of sugar and urea is of great importance in maintaining the general osmotic pressure in the internal environment. The content of these osmotically active substances and their effect on water-salt metabolism in many pathological conditions can increase sharply. Therefore, in case of any violations of homeostasis, it is necessary to determine the concentration of sugar and urea. Due to the above, in young children, in violation of the water-salt and protein regimes, a state of latent hyper- or hyposmosis, hyperazotemia may develop.

As you know, a living cell is a mobile, self-regulating system. Its internal organization is supported by active processes aimed at limiting, preventing or eliminating shifts caused by various influences from the external and internal environment. The ability to return to the initial state after a deviation from a certain average level caused by this or that "disturbing" factor is the main property of the cell. A multicellular organism is a holistic organization, the cellular elements of which are specialized to perform various functions. Interaction within the body is carried out by complex regulatory, coordinating and correlating mechanisms with the participation of nervous, humoral, metabolic and other factors. A multitude of separate mechanisms regulating intra- and intercellular relationships, in a number of cases, have mutually opposite effects, balancing each other. This leads to the establishment in the body of a mobile physiological background (physiological balance) and allows the living system to maintain a relative dynamic constancy, despite changes in the environment and shifts that occur in the process of vital activity of the body.

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