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MEDICAL SCIENCES

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HISTORY OF THE DEVELOPMENT OF CHRONORHYTHMOLOGY AS A SCIENCE

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Abstract. The adaptation of organisms in the process of evolution took place in the direction of the development of their structural organization and coherence in time and space of activity of different functional systems. On the problem of perception of time by animals and humans worked by I.P. Pavlov, V.M. Bekhterev, S.S. Korsakov. Ecological and physiological aspects of rhythmic processes were studied by V.V. Elephant. The role of biorhythms in the regulation of body functions, their changes in space flight – V.V. Parin.

Key words: history, chronobiorhythms, melatonin, pineal gland, desynchronosis.

The stability of the periodicity of changes in light, temperature, humidity, geomagnetic field and other environmental parameters due to the movement of the

Earth and Moon around the Sun, allowed living systems in evolution to develop stable and resistant to external time programs, manifested by biorhythms

At present biorhythmic approaches in Ukraine are being developed in almost all branches of medicine as predicted circadian fluctuations can help diagnose certain diseases, and chronotherapy aims to synchronize treatment with internal fluctuations in the intensity of pathological processes. In modern physiology, elucidation of chronorhythmic aspects of neurohumoral and intracellular mechanisms of homeostasis regulation remains one of the most pressing issues. In modern physiology, elucidation of chronorhythmic aspects of neurohumoral and intracellular mechanisms of homeostasis regulation remains one of the most pressing issues [1, c. 763].

I.F. Labunets notes that rhythmicity is considered a mandatory property of living matter at all levels of the organization, and the study of rhythms of functioning of various body systems, factors influencing their formation, is of direct interest to modern biology.

It is known that the pineal gland plays an important role in the processes of adaptation to various environmental factors. It is believed that this organ indirectly, through melatonin, synchronizes daily, seasonal and annual rhythms at all levels of the body, and suprachiasmatic nuclei of the hypothalamus are considered the main generator of chronorhythms of most body functions [2, c. 450].

At present the elucidation of chronorhythmic aspects of neurohumoral and intracellular mechanisms of homeostasis regulation remains one of the most pressing issues in modern physiology.

Literature data provide conclusive evidence of the involvement of the pineal gland and its key hormone melatonin in the regulation of excretory, ion-regulating, acid-regulating, osmoregulatory, volume-regulating and other renal functions, Light stimuli, as exogenous factors in the formation of the circadian rhythm of renal activity, are mediated through the pineal gland. After pinealectomy, desynchrony of diuretic reaction and ion-regulating function of the kidneys develops, which is manifested by a decrease in the amplitude of oscillations, a shift in the rhythm of

urination and potassium from night to daytime. Removal of the pineal gland is characterized by severe kaliuresis, moderate hypokalemia, and compensated acidosis.

O.V. Korkushko, T.D. Nikula (2006, 2008) in their works emphasize that in violation of the physiological mechanisms of chronorhythms of renal function, we study mainly daily, round-the-clock and seasonal chronobiorhythms as a criterion for their functional state [3, c. 269].

L.O. Bondarenko believes that all physiological processes have a rhythmic character and take place with a certain frequency at different levels of the organization - from molecular to organismal and population, so the rhythms of individual indicators and functions are normally synchronized with each other, which provides high performance, as well as thanks rhythmic changes make possible the existence of living organisms in a complex and dynamic environment. The photoperiod plays a significant role in the synchronization of circadian rhythms of living beings' functioning, providing all organs and systems with conditions for detecting maximum activity during the day and rest at night.

Rhythmicity is considered a mandatory property of living matter at all levels of the organization, and the study of rhythms of functioning of various body systems, factors influencing their formation, is of direct interest to modern biology and medicine [4, c. 3].

Doctors have long known about the rhythmic organization of certain body functions. In Tibetan medicine, the concept of biorhythms has become basic in the idea of the functioning of the organism, and their study was formed in the twentieth century as a field of medical and biological research. The existence of many periodic processes, the diversity of their relationships in biological systems. This contributed to the recognition of the principle of rhythm as a universal form of organization of wildlife. In healthy people, the rhythms of physiological processes are synchronized with each other and with the rhythms of the environment, and synchronization of biorhythms, preservation of their phase relationships provide optimal conditions for the body and is a sign of health.

Biorhythmology is engaged in elucidation of the organization of biological systems, the role of the time factor in the implementation of biological phenomena and the behavior of living systems, the nature, conditions of origin and significance of biorhythms for organisms. One of the areas of biology - chronobiology - studies the biorhythms and mechanisms underlying them [5, c. 4].

O.N. Aghajanyan found that chronomedicine is on the border of biorhythmology and clinical medicine, which studies biorhythms in the course of various diseases, develops rational treatment and prevention schemes, taking into account biorhythms and their disorders.

Biorhythms are the result of natural selection. In the struggle for existence survived only those organisms that could perceive time and respond to it. There are about 900 functions that have a daily frequency. Different body functions have different rhythms of intensity.

The number of platelets in a person's peripheral blood decreases at night and increases in the morning and afternoon. The content of angiotensin (AN) is highest in the morning and decreases to a minimum at 18 hours, so the data of daily activity of various human systems should be considered in the clinic. To define rhythms that are synchronous with the rhythms of the environment, use the terms circadian (round the clock), circatidal (tidal), circular (around the moon), zircannual (around the year).

The following parameters are used to describe the rhythm: period or frequency, amplitude - maximum deviation from the mean, phase - positive or negative, acrophase - time of maximum deviation. In the analysis of many physiological parameters, it is possible to identify diurnal reproducible peak types of the value of this parameter and its lowest value.

There are rhythms of high, medium and low frequency. High-frequency rhythms include biorhythms with a period of a fraction of a second to 30 minutes. These include rhythms of electrical activity of the brain, heart muscle, respiratory rhythm. Registration of high-frequency rhythms of organs and tissues is widely used

to diagnose various diseases and assess the functional status of relevant organs and systems [6, c. 45].

According to Halberg's classification, biorhythms are divided into groups depending on their frequency:

1. High frequency (less than 0.5 hours).
2. Medium frequency: ultradian (from 0.5 h to 20 h), daytime, infradian (from 28 h to 6 days).
3. Low frequency: whitewashed, lunar, annual.

Depending on the biological role, rhythms are considered both adaptive and functional.

The concept of the circadian system of the organism has been adopted, the functional parts of which are the suprachiasmatic nuclei of the hypothalamus, the pineal gland, the retina, and the neural pathways that connect them. SSCs are considered to be the main generator of biorhythms of most body functions, which is extremely sensitive to the influence of various environmental factors.

Research E.B. Arushanyan found that the most important regulator of central nervous system (CNS) activity is the neurohormone melatonin, which is synthesized mainly in the pineal gland during the dark period of the day and acts as the main signal that coordinates the rhythms of immune and endocrine systems in the environment.

There are two types of desynchrony - internal and external violation of the synchronization of the body's own biorhythms with the rhythms of the environment. Desynchronoses can be the cause of pathological conditions and accompany them.

In a series of studies O.V. Korkushko manifestations of desynchrony are observed in many diseases of the cardiovascular, respiratory, endocrine, digestive, urinary and other systems. This is manifested by sleep and mood disorders, reflex time, excretory renal function, seasonal depression, arterial hypo- and hypertension with nocturnal elevation of blood pressure, seasonal exacerbation of peptic ulcer

disease, bronchial asthma, palmar sweating and chlorine and collagenosis. Changes in body temperature are especially noticeable. At night it is about 1°C lower than during the day [7, c. 30].

The nature of changes in the circadian rhythm of functions is determined by the action of etiological factors and reflects the specifics of pathological processes that caused such a restructuring, carries diagnostic information. The study of chronobiological patterns creates a theoretical basis for the development of methods for identifying risk factors for development, early diagnosis, prognosis of pathology. The experience of other countries can be used only in part, as chronobiorhythms are influenced by lifestyle, intensity of physical activity during the day, the ratio of sleep and activity periods, time of year. The coherence of the functioning of the body's structures depends on the correction of chronobiological disorders, therefore, full recovery.

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