Crimson Publishers
Wings to the Research

Opinion

Again, about the Rhythms of Biological Processes

Marina P Chernysheva*

St-Petersburg State University, St-Petersburg Med Social Institute, Russia

Opinion

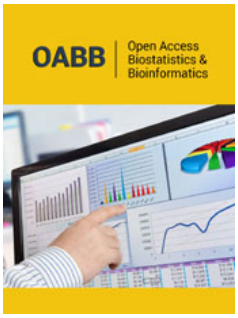
Biological rhythms are one of the components of the endogenous time of an organism as a set of all its temporal processes. Circadian, ultra- and intracardiac rhythms have such temporal parameters as latency, speed, period, duration and frequency, i.e., are temporary processes. They are superimposed on the directed time of ontogenesis and, together with monophasic processes, trends and cycles, determine the biochemical and physiological specifics of its certain periods. Numerous studies of the past three decades have contributed to the understanding of the types of molecular oscillators that shape cellular rhythms. These include: an oscillator of impulse activity in neurons and some endocrinocytes; an oscillator that reflects the circadian rhythms of the cAMP and Ca2+ content; redox oscillator and finally PER - oscillator, working on the basis of interactions of clock proteins [1-5]. The specificity of the interaction of these oscillators in cells of different tissues is gradually becoming clear: in endocrinocytes, in blood cells, in hepatocytes and adipocytes. However, the essence of the functions of the rhythms themselves as time processes is not clear enough.

Note that the functions of rhythms are a consequence of such properties as the relative stability of the period and amplitude. The first allows us to consider it as a time- stereotype of the processing of information entering the organism, as well as a pattern of efferent signals [2]. This allows the rhythm to structure the flows of exo- and endogenous information through their synchronization. It is known that when homeostasis is disturbed, rhythm synchronization increases. The relative stability of the rhythm amplitude reduces the range of variability of homeostatic constants (blood pressure, temperature, hematopoiesis, etc.), as well as energy expenditure on their homeostatic regulation, giving it an outstripping character. Rhythms contribute to a decrease in chaos and an increase in h - the coefficient of ordering, which, in turn, reduces the rate of growth of generalized entropy. External “zeitgebers” of rhythm (for example, the Sun, Moon) and / or internal (for example, the heart) can be energy donors for rhythmogenesis. The listed functions of rhythms as temporal processes allow them to be considered as a powerful mechanism for maintaining homeostasis of the volume of information perceived and stored in memory, the energy potential of the organism and the parameters of endogenous time.

References

1. Chauhan AK, Neil SM (2019) Hydrogen peroxide gates a voltage-dependent cation current in Aplysia neuroendocrine cells. Journal of Neuroscience 39(50): 9900-9913.
2. Chernysheva MP (2016) Time-structure of an organism and biological time. p. 269.
3. Chernysheva MP, Nozdrachev AD (2019) Neuropeptides as regulators of the interactions of cellular rhythm oscillators. Molecular Med T 17(1): 12-18.
4. Hoyle NP, O’Neill JS (2015) Oxidation-reduction cycles of peroxiredoxin proteins and non-transcriptional aspects of time keeping. Biochemistry 54(2): 184-193.
5. Tyssowski KM, Katherine CL, Samuel DR, Chao Tan, Nizhnik A, et al. (2019) Firing rate homeostasis can occur in the absence of neuronal activity-regulated transcription. J Neurosci 39(50): 9885-9899.

ISSN: 2578-0247



***Corresponding author:** Marina P Chernysheva, St-Petersburg State University, St-Petersburg Med Social Institute, Russia

Submission: February 12, 2021
Published: February 25, 2021

Volume 3 - Issue 2

How to cite this article: Marina P Chernysheva. Again, about the Rhythms of Biological Processes. Open Acc Biostat Bioinform. 3(2). OABB.000560. 2021.
DOI: 10.31031/OABB.2021.03.000560