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Functional Mechanisms To Ensure The Reactivity Of The Organism.

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ABSTRACT

The body's reactivity is an important component of ensuring its homeostasis. During the life of the organism and under different conditions, the reactivity of the organism may vary widely. The most optimal, in terms of reactivity, is considered the average period of a person's life, when program response mechanisms are fully deployed and regulatory systems are active. At this time of life, the body's response to various factors becomes complex, and the reactivity reaches its maximum. From about 40-50 years, the reactivity gradually decreases, there is a tendency to increase its imperfections. All this is true for specific and non-specific reactivity. Specific reactivity - the body's ability to respond to the action of an agent specifically. Nonspecific reactivity is the ability of an organism to respond to the action of various agents by the same type of reaction. The same can be said about physiological and pathological reactivity. The isolation of these forms of reactivity is associated with the biological significance of the body's response to external stimuli. It is believed that physiological reactivity is an adequate, by the nature and intensity, the body's responses to the effects of agents that occur within the limits that do not violate its homeostasis. Such a reactivity of a healthy organism ensures its adaptation to the factors of the external and internal environment and often avoids the disease. Pathological reactivity is an inadequate response and response of the body to the effects of agents, accompanied by impaired homeostasis and reducing its adaptation.

Keywords: ontogenesis, reactivity, resistance, reaction, organism.

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INTRODUCTION

The body's reactivity is an important component of ensuring its homeostasis. During the life of the organism and in different states, the reactivity of the organism can vary widely [1, 2]. The most optimal, in terms of reactivity, is considered the average period of a person's life, when program response mechanisms are fully deployed and regulatory systems are active. At this time, the body's response to various factors becomes diverse and complex, and its reactivity is very high [3, 4]. From about 40-50 years, the effectiveness of the response gradually decreases, there is a tendency to increase imperfection of reactivity. In old age, there is a limitation of the lability of the regulatory systems of the response mechanisms, a narrowing of their ability to quickly and timely restructuring [5]. Elderly people become susceptible to infections, they often develop various inflammatory processes, the number of immune disorders increases, they are more susceptible to oncological diseases [6]. The reason for this - the depletion of the immune system, reducing the functions of the barrier systems of the body. There is also a weakening of the regeneration processes, limited freedom of response (the range of response between its upper and lower limits decreases), there is a lack of regulatory and integrative mechanisms (dysfunction of the central nervous system, endocrine and other systems) [7]. Given the importance of this problem, the goal is set in the work: to carefully consider the main functional aspects of reactivity.

There are several groups of theories of aging that address issues of senile involution from different perspectives. Some of them represent aging as "wear" - this is a state of the organism that forms during its life activity and is accompanied by a gradual development of the degradation of cells and their structures [8]. The basics of wear are assumed to be the fluctuation of long-lived colloids of the body, gradual compaction, degradation, coagulation and decrease in the course of aging of the solubility of plasma proteins of the body without their adequate autolysis, as well as the accumulation of somatic mutations [9].

As the molecular mechanisms of "wear of colloids" during aging and the appearance of its other signs, Hermen's theory is currently the most demonstrative. Aging, in his opinion, depends on the imbalance between oxidative and antioxidant cell systems that occurs with age: in the direction of increasing the activity of the first and weakening the effectiveness of the second [10]. Indeed, aging is characterized by increased generation and the prolonged existence of free oxygen radicals and the weakening of antioxidant cell systems. They are capable of causing fluctuations and a decrease in the dispersion of cytoplasmic protein colloids. The result of oxidation is the accumulation of a significant amount of carbonyl groups in the enzymatic proteins of the body, this leads to a gradual slowdown and inactivation of the metabolism of oxidized proteins and, ultimately, impaired function of cells and organs. Aging pigments - lipofuscin, hemosiderin, are formed with the active participation of auto-oxidative, free-radical reactions [11].

The well-known hypothesis II. Mechnikov on the role of auto-intoxication with intestinal poisons in aging processes (products of bacteria in the large intestines). The prolonged action of these compounds (indole, cresol) also causes, in his opinion, senile degradation of cells and their structures. It turned out that neutralization of indole and cresol occurs with the participation of antioxidant systems of the body [12].

Thus, Hermen's theory plays an integrative role in the study of the mechanisms of aging, considered from the point of view of its wear. Another group of hypotheses represents old age - as a genetically programmed process [13].

Back in the 19th century, the Russian physiologist I.R. Tarkhanov suggested that the cause of natural old age is not the wear of the organism, but the gradual restriction of the ability of cells to create and reproduce. He saw the reason for this in a change in nuclear matter. With the development of genetics, the accumulation of factual material, this provision has received objective evidence. The famous experiments of L. Hayflick and P. Moorhead showed that normal diploid fibroblasts of the early human embryo are capable of doubling in cell culture a limited number of times — about 50. This was called the Hayflick cell division limit [14].

There is information about the localization of "old age" genes in chromosome 1 and 4 — turning off the c-foc gene located there prevents cell proliferation [15]. A gene in yeast (LAG) responsible for the extension of life has been identified, it is similar to some human genes. The involvement of apoptosis mechanisms in the senile process, which depends on the expression or inhibition of specific genes (p 53, bcl-2, etc.), is also

assumed. An indirect confirmation of this is the "immortality" of tumor cells, "leaving" from the mechanisms of apoptosis and not having the limit of cell division of Hayflick. All these data indicate the recent role of genetic control in the mechanisms of aging. In the mechanisms of development of age-related changes there are several options [16]:

- option one - the causes of aging equally and simultaneously affect the various elements of the body, leading them to a uniform violation [17];
- version of the second - allocate one link in the body, which due to its weakness or increased load on it first fails. It further becomes a peculiar driver of age-related changes and causes secondary changes in other, more stable links. Integrating reactivity systems - the central nervous system, the endocrine system and the immune system [18] primarily claim the role of the pacemaker of aging.
- option three - aging occurs as a result of the activity of certain mechanisms for which the generation of age-related changes in other organs and tissues is a normal function. Moreover, it is not necessary that this generation belong to the same entities, it can consistently move from one to another [19].

To date, there is no convincing evidence in favor of any of the three options, i.e. the “main place” of aging has not yet been allocated [20].

In age-related and pathological changes, a large role is played by specific and non-specific reactivity. Specific reactivity is the ability of an organism to respond to the action of an agent specifically and differentially. A classic example is the development of immunity to antigenic effects. In this case, the body reacts to the action of the antigen by producing antibodies or a complex of cellular reactions that are specific to the antigen and [21, 22].

Manifestations of specific reactivity are: allergy, specific immunity, autoimmune diseases, immunodetsitsitnye and immunodepressive states, immunoproliferative diseases [23].

Nonspecific reactivity is the ability of an organism to respond to the action of various agents by the same type of reaction. It is implemented using such mechanisms as stress, the acute phase response, activation of phagocytosis to foreign cells, bacteria, viruses, protozoa, inorganic substances [24]. In response to excessive stimuli (massive injuries, blood loss, pain), the body responds by developing a typical process — shock [25]. In so many diseases, inflammation, fever, and hypoxia can be given as an example of non-specific reactivity. Mechanisms of specific and non-specific reactivity are often observed simultaneously [26]. So with infections, autoimmune diseases, malignant tumors, the mechanisms include both specific (antibody production, activation of cellular immunity), and nonspecific response (leukocytosis, fever, hypoxia).

The severity of the response of the organism is determined by hereditary and acquired properties [27]. The hereditary can be attributed - genetically determined threshold of receptor sensitivity and / or their number on the reacting substrate (cell), the isozyme composition of the individual, which determines the nature of biochemical reactions and features of their development in each person [28, 29].

There is a physiological and pathological reactivity. The isolation of these forms of reactivity is explained by the biological significance (expediency) of the body’s response to an agent [30]. Physiological reactivity is an adequate, by nature and intensity, responses of the body to agents, within the limits that do not violate its homeostasis [31]. This is the reactivity of a healthy organism, ensuring its adaptation to the factors of the external and internal environment and often avoiding the disease [32]. For example, the inclusion of mechanisms of contractile and non-contractile thermogenesis with moderate hypothermia, tachycardia and tachypia during exercise, digestive leukocytosis [33].

Pathological reactivity is inadequate in terms of its severity and nature of the body’s response to the effects of agents, accompanied by a violation of its homeostasis and reducing adaptive capacity [34]. In fact, the development of the disease and its manifestations are the pathological reactivity [35]. The manifestation of this reactivity, for example in shock, will be a decrease in resistance to infectious pathogens, inhibition of phagocytosis, and a change in drug sensitivity [36]. One of the response to inflammation is the formation of biologically active substances that cause damage to cells that are not affected by a meeting with an agent that caused inflammation - secondary alteration develops. Allergy, immunodeficiency and immunosuppressive

states are also examples of pathological reactivity [37]. First of all, reactivity depends on the state of the body. Compensatory-adaptive mechanisms of a healthy and sick person are not the same. Reactivity of the patient is characterized by a decrease in optimal vital activity, limiting the breadth of response [38]. In patients with anemia there will be less opportunity to adapt to hypoxia than in healthy people, hence the decline in their vital activity.

CONCLUSION

The most optimal, in terms of reactivity, is considered the average period of a person's life, when program response mechanisms are fully deployed and regulatory systems are active. At this time, the body's response to various factors becomes diverse and complex, and the reactivity is very high. With aging, the effectiveness of the response gradually decreases, there is a tendency to increase imperfection of reactivity. The specific and nonspecific reactivity suffers. Specific reactivity is the ability of an organism to respond to the action of an agent specifically, differentially. Nonspecific reactivity is the ability of an organism to respond to the action of various agents by the same type of reaction. The severity of the response of the organism is determined by hereditary and acquired properties. There is a physiological and pathological reactivity. The isolation of these forms of reactivity is explained by the biological significance of the body's response to a particular agent. Physiological reactivity - these are adequate, in nature and intensity, the body's responses to agents, within the limits that do not violate its homeostasis. Reactivity of a healthy organism, ensuring its adaptation to the factors of the external and internal environment, and often avoids the disease. Pathological reactivity is an inadequate response to the effects of agents in terms of severity and nature of the organism, accompanied by a violation of its homeostasis and reducing adaptive capacity, aggravating the pathology.

REFERENCES

[1] Bikbulatova AA, Matraeva LV, Erokhin SG, Makeeva DR, Karplyuk AV. (2018) Methodical Foundations Of Carrying Out Competitions Of Professional Skill Among People With Disabilities. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 243-247.

[2] Vorobyeva NV, Mal GS, Skripleva EV, Skriplev AV, Skoblikova TV. (2018) The Combined Impact Of Amlodipin And Regular Physical Exercises On Platelet And Inflammatory Markers In Patients With Arterial Hypertension. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4) : 1186-1192.

[3] Maksimov VI, Zavalishina SYu, Parakhnevich AV, Klimova EN, Garbart NA, Zabolotnaya AA, Kovalev YuI, Nikiforova TYu, Sizoreva EI. (2018) Physiological Dynamics Of Microrheological Characteristics Of Erythrocytes In Piglets During The Phase Of Milk Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 454-459.

[4] Tkacheva ES, Zavalishina SYu. (2018) Physiological Features Of Platelet Aggregation In Newborn Piglets. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 36-42.

[5] Bikbulatova AA, Pochinok NB, Matraeva LV, Erokhin SG, Makeeva DR, Karplyuk AV. (2018) Formation Of International Practice Of Holding Competitions Of Professional Skills Among Professionals With Disabilities. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 296-302.

[6] Bikbulatova AA, Pochinok NB, Matraeva LV, Erokhin SG, Makeeva DR, Karplyuk AV. (2018) The Russian Historical Aspect Of The Development Of The International Federation Of Abilimpix. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(5) :329-335.

[7] Bikbulatova AA, Pochinok NB, Soldatov AA, Matraeva LV, Erokhin SG. (2018) Organization Of International Competitions Of Professional Skill Among People With Disabilities. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 379-387.

[8] Zavalishina SYu. (2018) Functional Activity Of Anticoagulant System In Calves During Early Ontogeny. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 837-843.

[9] Maksimov VI, Zavalishina SYu, Parakhnevich AV, Klimova EN, Garbart NA, Zabolotnaya AA, Kovalev YuI, Nikiforova TYu, Sizoreva EI. (2018) Functional Activity Of The Blood Coagulation System Against The Background Of The Influence Of Krezacin And Gamavit In Newborn Piglets WhoUnderwent Acute Hypoxia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 2037-2042.

[10] Tkacheva ES, Zavalishina SYu. (2018) Physiological Aspects Of Platelet Aggregation In Piglets Of Milk Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 74-80.

[11] Tkacheva ES, Zavalishina SYu. (2018) Physiology Of Platelet Hemostasis In Piglets During The Phase Of Newborns. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 1912-1918.
[12] Zavalishina SYu. (2018) Physiological Mechanisms Of Hemostasis In Living Organisms. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 629-634.
[13] Zavalishina SYu. (2018) Functional Properties Of Anticoagulant And Fibrinolytic Activity Of Blood Plasma In Calves In The Phase Of Milk Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 659-664.
[14] Zavalishina SYu. (2018) Physiological Dynamics Of The Blood Coagulation System Activity In Calves During The Phase Of Dairy Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 680-685.
[15] Zavalishina SYu. (2018) Functional Activity Of The Blood Clotting System In Calves During The Phase Of Milk And Vegetable Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 720-725.
[16] Zavalishina SYu. (2018) Anti-Coagulant And Fibrinolytic Activity Of Blood Plasma In Healthy Calves Of Dairy-Vegetative Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 753-758.
[17] Bikbulatova AA.(2018) Technology Implementation Of Competitions Of Professional Skill. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 407-419.
[18] Bikbulatova AA, Kartoshkin SA, Pochinok NB. (2018) Schemes Of Competitions Of Professional Skills Among People With Disabilities In Russia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 357-362.
[19] Zavalishina SYu. (2018) Functional Properties Of Coagulation Hemostasis In Calves During The Phase Of Dairy-Vegetative Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 784-790.
[20] Zavalishina SYu. (2018) Functioning Of Mechanisms Of Hemocoagulation Restriction In Calves At Change Of Methods Of Nutrition. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 800-806.
[21] Skoryatina IA, Zavalishina SYu. (2017) Ability to aggregation of basic regular blood elements of patients with hypertension anddyslipidemia receiving non-medication andsimvastatin. Bali Medical Journal. 6(3):514-520. DOI:10.15562/bmj.v6i3.553.
[22] Bikbulatova AA. (2018) Peculiarities of abnormalities of locomotor apparatus of children at preschool age with scoliosis of I-II degree living in Central Russia. Bali Medical Journal. 7(3): 693-697. DOI:10.15562/bmj.v7i3.738.
[23] Bespalov DV, Kharitonov EL, Zavalishina SYu, Mal GS, Makurina ON. (2018) Physiological Basis For The Distribution Of Functions In The Cerebral Cortex. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5): 605-612.
[24] Skorjatina IA. (2018) Therapeutic Possibilities Of Rosuvastatin In The Medical Complex In Relation To Disaggregation Vascular Control Over Erythrocytes In Persons With Arterial Hypertension And Dyslipidemia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(2) : 977-983.
[25] Apanasyuk LA, Soldatov AA. (2017) Socio-Psychological Conditions for Optimizing Intercultural Interaction in the Educational Space of the University. Scientific Notes of Russian State Social University. 16(5-144) : 143-150. doi: 10.17922/2071-5323- 2017-16-5-143-150.
[26] Bikbulatova AA, Andreeva EG. (2018) Achievement of psychological comfort in 5-6-Year-Old children with scoliosis against the background of daily medicinal-prophylactic clothes' wearing for half a year. Bali Medical Journal. 7(3): 706-711. DOI:10.15562/bmj.v7i3.947.
[27] Bikbulatova AA, Andreeva EG. (2018) Restoration Of The Profile Of Bioregulators Of Blood Plasma In People Of Second Adulthood With Osteochondrosis Of The Spine Against The Background Of Daily Wearing Of Medical And Preventive Clothing. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4) : 413-419.
[28] Bikbulatova AA. (2018) Bioregulatory Effects Of The Daily Wearing Of Medical And Preventive Pants On The Body Of Pregnant Women Suffering From Habitual Miscarriages Of The Fetus. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4) : 889-896.
[29] Bikbulatova AA, Karplyuk AV. (2018) Professional And Labor Orientation Of Persons With Disabilities In The Resource Educational And Methodological Center Of The Russian State Social University. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4) : 1648-1655.

[30] Maloletko AN, Yudina TN. (2017) (Un)Making Europe: Capitalism, Solidarities, Subjectivities. Contemporary problems of social work. 3 (3-11) : 4-5.
[31] Glagoleva TI, Zavalishina SYu, Mal GS, Makurina ON, Skorjatina IA. (2018) Physiological Features Of Hemo-coagulation In Sows During Sucking. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4):29-33.
[32] Zavalishina SYu, Makurina ON, Vorobyeva NV, Mal GS, Glagoleva TI. (2018) Physiological Features Of Surface Properties Of The Erythrocyte Membrane In Newborn Piglets. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4):34-38.
[33] Pozdnyakova ML, Soldatov AA. (2017) The Essential and Forms of the Approaches to Control the Documents Execution. Contemporary problems of social work. 3 (1-9): 39-46. doi: 10.17922/2412-5466-2017-3-1-39-46.
[34] Bikbulatova AA, Karplyuk AA, Parshin GN, Dzhafar-Zade DA, Serebryakov AG. (2018) Technique for Measuring Vocational Interests and Inclinations in High-School Students with Disabilities. Psikhologicheskaya nauka i obrazovanie-psychological science and education. 23(2) : 50-58.doi: 10.17759/pse.2018230206.
[35] Makhova AV. (2018) Physiology Of The Hypothalamus In The Human Body. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(5) : 478-484.
[36] Gusarov AV, Kornev AV, Kartashev VP, Nekrasova MV. (2018) Effect Of Static Exercises With A Deflection On The Tone Of The Skeletal Musculature Of Middle-Aged Women. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4) : 1716-1724.
[37] Zhalilov AV, Mironov IS. (2018) Identification Of The Most Significant Shortcomings Of Sports Competitions In Sambo Among People With Hearing Impairment In A Separate Region Of Russia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3) : 672-677.
[38] Alifirov AI, Mikhaylova IV. (2018) Physical Education Of Highly Qualified Chess Players. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4) : 1725-1730.