ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Physiological Basis For The Distribution Of Functions In The Cerebral Cortex.

Bespalov DV[1], Kharitonov EL[2], Zavalishina S Yu[3]*, Mal GS[4], and Makurina ON[5].

[1]Kursk State University, st. Radischeva, 33, Kursk, Russia, 305000
[2]All-Russian Research Institute of Physiology, Biochemistry and Nutrition of Animals, Institute of Village, Borovsk, Russia, 249013
[3]Russian State Social University, st. V. Pika, 4, Moscow, Russia, 129226
[4]Kursk State Medical University, st. K. Marx, 3, Kursk, Russia, 305000
[5]Samara State University, st. Akademika Pavlova, 1, Samara, Russia, 443011

ABSTRACT

The cortex of the cerebral hemispheres is the most differentiated and complexly arranged nervous structure. The higher forms of reflection of the external world, all kinds of higher nervous activity, are connected with the bark. The bark works in a clear relationship with the rest of the brain. This part of the body has certain characteristics related to its specific activities. In the process of functioning, the bark analyzes the information received from the bodies, carries out its storage and, if necessary, transfers it to other parts of the body. The structure of the cerebral cortex is very difficult. This is due to the fact that it is responsible for all manifestations of higher nervous activity. The right and left hemispheres have differences in their functional purpose. Logic and mathematical abilities are provided by the left hemisphere. Developing the left brain hemisphere is helped by intellectual games (chess, maps, smart applications and others), solving crosswords, puzzles, keeping a diary and other activities that traditionally require the activation of mental abilities. The right hemisphere develops drawing, writing poetry, playing musical instruments and fantasizing about any topic. And in the latter case, fantasy is desirable to draw on paper or express in sounds, thereby making the right hemisphere work. Both hemispheres develop in sports or active recreation. It is highly undesirable to have a functional skew in the development of one of the hemispheres, since this makes it difficult to synchronize their interaction.

Keywords: brain, cerebral cortex, cerebral cortical functions, projection fields of the cortex, higher nervous activity.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

The human cerebral cortex is the most differentiated and complexly arranged nervous structure [1,2]. The higher forms of reflection of the external world, all kinds of conscious human activity, are connected with the bark. The bark works in conjunction with the rest of the human brain structures [3]. This part of the body has certain characteristics related to its specific activities. The main basic function of the cortex is the analysis of information received from the bodies of information and storage of the obtained data, as well as their transfer to other parts of the body [4].

The formation of the fissures of the hemispheres begins at the 5th month of embryonic development, by that time there are full, synapses and myelination of nerve cells occurs. The first is formed lateral (sylvia) furrow, then there are other primary furrows: central (Roland), parietal-occipital, hippocampal, spurs [5]. Since 7 months the formation of furrows is very fast, secondary furrows appear and at the end of the intrauterine period, the relief of the hemispheres is mainly formed [6]. After birth, the formation of small tertiary furrows, which determine the individual features of the relief of the hemispheres. A characteristic feature of the large hemispheres is their asymmetry, although outwardly they are very similar to each other [7]. It is believed that the differences serve as an external expression of the functional asymmetry of the cerebral hemispheres. Differences in the arrangement of the furrows of the right and left hemispheres, as well as in the magnitude of some of the convolutions, are noted. The structure and function of the cerebral cortex is still very much unclear. It is important to generalize the basics of knowledge about them with the support of accessible literature.

Purpose: to summarize the basic knowledge of the basics of the functioning of the human cerebral cortex.

The projection fields of the crust

Each hemisphere consists of five parts: frontal, parietal, occipital, temporal and islet, or islet located in the depth of the lateral sulcus. In humans, the frontal part of the hemisphere weighs 450 g, parietal - 251 g, temporal and occipital together - 383 g. The border between the frontal and parietal lobes is the central furrow, between the parietal and occipital - parietal-occipital. The temporal lobe is separated from the rest of the lobes by a lateral groove. On the upper-lateral surface of the hemisphere, a precentral furrow separating the precentral gyrus and two frontal furrows are distinguished in the frontal lobe: the superior and the lower fissures, dividing the rest of the frontal lobe into the upper, middle and lower frontal gyrus. In the parietal lobe there pass a postcentral groove separating the postcentral gyrus, and an intertrained sulcus dividing the rest of the parietal lobe into the upper and lower parietal lobes. In the lower lobe, the marginal and angular convolutions are distinguished [8,9]. Two parallel furrows-the upper and lower temporal lobes divide the temporal lobe on the upper, middle and lower temporal gyrus. In the occipital lobe, transverse occipital furrows and convolutions are distinguished. On the medial surface of the hemisphere, the furrows of the corpus callosum and the furrow furrow are clearly visible, between which is the gyrus gyrus. Above it, surrounding the central furrow, lies the paracentral lobe. The section between the parietal occipital furrow and the furrowing furrow passing behind it is called a wedge, and the lying in front of it is a pre-incline. In the place of transition to the lower surface of the hemisphere, the medial occipitoval-temporal, or lingual, gyrus is distinguished. On the lower surface, separating the hemisphere from the brain stem, there is a deep furrow of the hippocampus, outside of which is the parahypocampal gyrus. Lateral it is separated by a collateral groove from the lateral occipital-temporal gyrus. The islet, located in the depth of the lateral furrow, is also covered with furrows and convolutions [10, 11].

The olfactory brain in man is represented by rudimentary formations, well expressed in animals. It constitutes the oldest parts of the cortex of the hemispheres [12].

Basal nuclei are a cluster of gray matter inside the hemispheres. These include the striatum, consisting of a caudate and a lenticular nucleus, connected to each other. The lenticular nucleus is divided into two parts: a shell located outside and a pale ball lying inside. They are subcortical motor centers. Outside the lenticular nucleus is a thin plate of gray matter - a fence, in the anterior part of the temporal lobe is an amygdala. Between the basal nuclei and the thalamus are interlayers of white matter, the inner, outer and outer capsules. Conducting paths pass through the inner capsule [13].

The white matter of the hemispheres occupies the space between the cortex and basal nuclei. It consists of a large number of nerve fibers running in different directions. There are three systems of fibers of the hemispheres: associative, connecting parts of the same hemisphere; commissural (adhesive), connecting parts of the right and left hemispheres, which include the corpus callosum, anterior spike and spike of the arch, and projective fibers, or conductive paths connecting the hemispheres with the underlying parts of the brain and the spinal cord [14].

Localization of functions in the cortex of the cerebral hemispheres. To study the localization of functions in the cortex of the cerebral hemispheres or, in other words, the values of individual areas of the cortex, various methods are used: partial removal of the cortex, electrical and chemical stimulation, recording of the brain biocurrents, and the method of conditioned reflexes [15].

The method of stimulation made it possible to establish the following zones in the cortex: motor (motor), sensory (sensory) and mute, which later were called associative [16].

The destruction of individual parts of the limbic system leads to a violation of behavior: people can become more calm or, conversely, aggressive, easily giving reactions to rage, sexual behavior changes. The limbic system has extensive connections with all areas of the brain, the reticular formation and the hypothalamus. It provides cortical control of all vegetative functions: cardiovascular, respiratory, digestive, metabolism, energy.

In structural-functional terms, the cerebral cortex can be divided into anterior (frontal lobe) and posterior (occipital, parietal and temporal lobes) sections. The border between them runs along the central furrow. The rear department realizes the perception of afferent signals. The cortical areas located here are not functionally functional, and they can be divided into primary, secondary and tertiary cortical fields [17].

Thus, the projection area provide mainly a simple specific physiological acts, especially the perception of sensations certain modality. Suitable for them projection pathways associated with these zones in their functional accordance of receptor areas on the periphery. Examples projection cortical areas are already described in previous chapters, the rear Central gyrus (area of General kinds of sensitivity) or located on the medial side of the occipital lobe region calcarine sulcus (visual projection area).

Primary fields of the crust

Primary fields of the cortex are clearly delineated areas that correspond to the central parts of the analyzers. In these fields, the majority of signals from the senses pass through specific projection afferent paths. Primary fields are characterized by a strong development of the internal granular plate. The primary fields are associated with the relay-nuclei of the thalamus and the cores of the cranked bodies. They have a screen structure and, as a rule, a rigid somatotopic projection, in which individual parts of the periphery are projected into the corresponding areas of the cortex. Damage to the primary fields of the cortex is accompanied by a violation of direct perception and fine differentiation of stimuli. In humans, these distortions can be induced artificially [18].

Modern technologies can have both a positive and negative impact on the work of the central nervous system of man, implying that the game industry develops in two ways, namely:

1. Games for entertainment

This is entertainment for the sake of entertainment, that is, a person does not need his knowledge, he is not forced to mental activity or stress. This "rest" is created so that a person can feel free and not burdened by business, even for a while. Maybe there and need to apply a share of knowledge, but it's all part of the concept of the rules of the game. Such games are "strategy", "shooters", "shooters" and "simulators of fights" [19].

2. Games for development

These games are aimed at developing human abilities in the light of mental activity. There are created applications that help the mastering of educational material, both within the school curriculum and beyond, for people of different ages [20].

Left and right hemispheres

The brain is a complex and interrelated system, the largest and most functionally important part of the central nervous system. The left hemisphere is responsible for logical and abstract thinking, right for motor skills. The two hemispheres can complement each other [21]. In case of damage to one of the hemispheres, its functions pass to the other half. The brain consists of two hemispheres. They have different functions (Table 1).

Table 1. Functions of the left and right hemisphere.

The left hemisphere of the brain determines	The right hemisphere of the brain determines
Processing of oral information	Perception of information in the form of symbols and images
Language learning opportunities	Imagination, dreams and fantasies
Speech control	Musical and visual abilities
Reading and writing level	Simultaneous processing of different types of information
Remembering facts, names, dates	Ability to isolate the problem as a whole without resorting to analysis
Logic and Analysis	Spatial orientation
Recognition of numbers and mathematical signs	Sex, mysticism and emotions
Consistent perception of information	
A literal understanding of words	

The right cerebral hemisphere of the greatest development and functioning reaches in the first years of life. The left catches up with him in the second year of life, and then the hemispheres begin alternately to overtake each other. The corpus callosum, which serves as a bridge for the hemispheres, reaches its final development at the age of 25, in women it is usually larger [22].

The female brain has the highest level of integration, and the male has a high level of differentiation and specialization: different sites work independently, not coordinated with other areas. If we imagine that the hemispheres control the physiological arena of the organism, the left hemisphere would seize the legislative power, and the right hemisphere would take over the executive. The left hemisphere of the brain is responsible for setting the goal, and the right one for its implementation [23,24].

Brodman's cytoarchitectonic fields

The functions of the hemispheres can be examined in detail in the cytoarchitectonic Brodman fields [25]. Each of these zones is responsible for certain functions in the human body.

1 zone - motor - is represented by the central gyrus and frontal zone in front of it - 4, 6, 8, 9 of the Broadman field. With her irritation, various motor reactions; when it is destroyed, there are violations of motor functions: adynamia, paresis, paralysis [26].

2 zone - sensitive - areas of the cerebral cortex posterior to the central sulcus (1, 2, 3, 4, 5, 7 of the Brodman field). When this zone is irritated, sensations arise, and when it breaks down, the skin, proprio, and interosensitivity fall out. Hypostezia - decreased sensitivity, anesthesia - loss of sensitivity, paresthesia - unusual sensations (goose bumps). The upper sections of the zone are represented by the skin of the lower extremities, genital organs. In the lower parts - the skin of the upper limbs, head, mouth. The 1st and 2nd zones are closely related to each other in a functional sense. There are many afferent neurons in the motor

area. In the sensitive area, many motor elements are sensorimotor zones - responsible for the occurrence of pain sensations [27].

3 zone - the visual zone - the occipital region of the cerebral cortex (17, 18, 19 of the Brodman field). At destruction of 17 fields - loss of visual sensations (cortical blindness). With the defeat of the 18th Broadman field, the functions associated with recognizing the visual image suffer and the perception of the letter is disrupted. With the defeat of the 19th Brodman field - there are various visual hallucinations, visual memory and other visual functions suffer [28].

4 - auditory zone - temporal region of the cerebral cortex (22, 41, 42 Broadman fields). With the defeat of 42 fields - the recognition of sounds is disrupted. With the destruction of 22 fields - there are auditory hallucinations, a violation of auditory orientation reactions, musical deafness. With the destruction of 41 fields - cortical deafness [29].

5 zone - olfactory - is located in a pear-shaped gyrus (11 Brodman field) [30].

6 zone - flavoring - 43 Brodman field.

7 zone - the speech-motor zone (according to Jackson - the center of speech) - most people (right-handed people) are located in the left hemisphere. This zone consists of 3 departments: Brook's motor center is the motor center of the muscles of the tongue. With the defeat of this area - motor aphasia. The sensory center of Wernicke is connected with the perception of oral speech. When a lesion occurs sensory aphasia - a person does not take oral speech, suffers pronunciation, as the perception of one's own speech is impaired. The center of perception of written speech is the 18th Broadman field. If the left-hander is injured in the right hemisphere, the function of speech suffers less, if the left hemisphere is damaged in children, then the right side takes on his function. In adults, the ability of the right hemisphere to reproduce speech functions is lost [31].

Secondary crustal fields

Secondary fields of the cortex are adjacent to the primary fields. They can be considered as peripheral parts of cortical analyzers. These fields are associated with the associative nuclei of the thalamus. When secondary fields are damaged, elementary sensations remain, but the ability to more complex perceptions is disturbed. Secondary fields do not have clear boundaries, they do not have a somatotrophic projection [32].

The secondary field of general sensitivity is localized in the upper parietal lobe (fields 5, 7). Secondary visual fields (18, 19) occupy the medial surface of the occipital lobe and most of the lateral surface. The secondary auditory field (22) is located in the upper and middle temporal convolutions. Secondary olfactory and taste fields are localized in the parahypocampal gyrus and hook (fields 28, 34) [33].

Tertiary crustal fields

Tertiary fields of the cortex are distinguished by the thinnest neuronal structure and the predominance of associative elements. They occupy the entire lower parietal lobe and part of the superior parietal lobe, as well as the occipitoval-temporal parietal region. These fields are associated with the posterior nuclei of the thalamus. In the tertiary fields, the most complex interactions of the analyzers, which underlie the cognitive process (gnosis), are realized, programs of purposeful actions (praxia) are formed.

The temporal lobe of the temporal lobe is related to the storage and reproduction of impressions. With electrical stimulation of certain points of the temporal cortex, specific reactions are observed in the form of "outbursts of the experience" or the sensation of "already seen". It is believed that a neural record of the flow of consciousness is created in the cortex of the temporal lobes, it is stored indefinitely, but can not be reproduced arbitrarily, but "revives" only with artificial stimulation and some disease states [34].

The most important feature of a person is articulate speech. Academician IP Pavlov referred speech to the second signal system, through which an indirect reflection of reality occurs. Speech functions have a broad

representation in the cerebral cortex [35]. Based on the data obtained during electrical stimulation and removal in patients of different parts of the cortex, three cortical speech fields were identified. The posterior speech field is located in the occipitoval-temporal parietal region, capturing all three temporal, marginal and angular convolutions. This field is associated primarily with the perception and understanding of speech and is functionally leading [36]. When his lesion is always a disorder of speech - aphasia. The front speech field lies in the back of the lower frontal gyrus and corresponds to Broca's motor center of speech. The upper, additional, speech field is localized at the upper edge of the hemisphere anterior to the precentral gyrus, when it is affected, speech disorders are not always observed [37]. Speech fields, like other parts of the cortex, are connected with the nuclei of the thalamus. The posterior field is associated with the posterior nucleus, the upper field with the lateral nucleus, the anterior field with the medial nuclei. All speech fields are connected by associative paths into a single functional system [38].

A feature of the speech centers of the cortex is their asymmetry. In most people, they are localized in the left hemisphere, which is dominant in relation to speech. It is generally accepted that this dominance is related to right-handedness, and that left-wingers are ruled by the right hemisphere. Recently, the question of the functional asymmetry of the hemispheres is treated more widely. The left hemisphere is associated with speech and abstract thinking, and with the right hemisphere - spatial representation, imaginative thinking, musical abilities [39].

CONCLUSION

The structure of the cerebral cortex is very difficult. This is due to the fact that it is responsible for all manifestations of higher nervous activity. The right and left hemispheres have differences in their functional purpose. Logic and mathematical abilities are provided by the left hemisphere. Developing the left brain hemisphere is helped by intellectual games (chess, maps, smart applications and others), solving crosswords, puzzles, keeping a diary and other activities that traditionally require the activation of mental abilities. The right hemisphere develops drawing, writing poetry, playing musical instruments and fantasizing about any topic. And in the latter case, fantasy is desirable to draw on paper or express in sounds, thereby making the right hemisphere work. Both hemispheres develop in sports or active recreation. It is highly undesirable to have a functional skew in the development of one of the hemispheres, since this makes it difficult to synchronize their interaction.

REFERENCES

[1] 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.

[2] Medvedev IN, Danilenko OA. (2010) Complex correction of vascular hemostasis in patients with arterial hypertension, metabolic syndrome, and recent ocular vessel occlusion. Russian Journal of Cardiology. 4:15-19.

[3] Medvedev IN, Mezentseva IN, Tolmachev VV. (2007) ACE inhibitors potential in correcting vessel wall anti-aggregation activity among patients with arterial hypertension and metabolic syndrome. Russian Journal of Cardiology. 1:48-52.

[4] Medvedev IN, Kumova TA. (2007) Comparison of platelet hemostasis effects for angiotensin receptor blockers in patients with arterial hypertension and metabolic syndrome. Russian Journal of Cardiology. 4:52-56.

[5] Medvedev IN, Nosova TYu. (2007) Verospiron effects on platelet aggregation in patients with arterial hypertension and abdominal obesity. Russian Journal of Cardiology. 6:55-58.

[6] Oshurkova JuL, Medvedev IN, Tkacheva ES. Functional Features Of Platelet Aggregation In Heifers Of The Ayrshire Breed, Which Are Being Prepared For Insemination. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1155-1160.

[7] Medvedev IN. (2018) Severity Of Vascular Disaggregation Effects On Erythrocytes In Patients With Arterial Hypertension With Abdominal Obesity And Dyslipidemia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1161-1165.

[8] Medvedev IN. (2018) Degree Of Violation Of Disaggregation Control Of Blood Vessels Over Platelets In Patients With Arterial Hypertension With Abdominal Obesity And Dyslipidemia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1166-1171.

[9] Medvedev IN. (2018) Disaggregation Control Of Vessels Over Neutrophils In Patients With Arterial Hypertension With Abdominal Obesity And Dyslipidemia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1172-1176.
[10] Medvedev IN. (2018) Vascular Control Of Erythrocytes In Patients With Hypertension With Hyperuricemia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1177-1181.
[11] Medvedev IN. (2018) Disorders Of Disaggregation Control Of Blood Vessels Over Platelets In Hypertensive Patients With Arterial Hypertension. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1182-1187.
[12] Medvedev IN. (2018) Disaggregation Effects Of Blood Vessels On Neutrophils In Patients With Arterial Hypertension With Hyperuricemia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1188-1192.
[13] Medvedev IN. (2018) Vascular Disaggregation Effects On Erythrocytes In Patients With Arterial Hypertension With Type 2 Diabetes Mellitus. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1193-1197.
[14] Medvedev IN. (2018) Intensity Control Disaggregation Of Platelets Vessels In Hypertensive Patients With Type 2 Diabetes Mellitus. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1198-1203.
[15] Medvedev IN. (2018) The State Of Vascular Disaggregation Effects On Neutrophils In Patients With Arterial Hypertension With Type 2 Diabetes Mellitus. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1204-1208.
[16] Medvedev IN. (2018) Disaggregation Effects Of Blood Vessels On Erythrocytes In Patients With Arterial Hypertension With Impaired Glucose Tolerance. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1209-1213.
[17] 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.
[18] Medvedev IN. (2018) Disaggregation Properties Of Blood Vessels In Relation To Platelets In Patients With Arterial Hypertension With Impaired Glucose Tolerance. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1214-1219.
[19] Alifirov AI, Mikhaylova IV. (2018) Physical Education Of Highly Qualified Chess Players. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(4) : 1725-1730.
[20] 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.
[21] Makhov A.S., Medvedev I.N. Physiologically Justified Method Of Practicing Sambo With Teenagers With Hearing Impairment. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4): 91-97.
[22] Makhov A.S., Medvedev I.N. Sport As A Means Of Social Rehabilitation Of People With Disabilities. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4): 170-174.
[23] Makhov A.S., Medvedev I.N. Assessment Of The Quality Of Paralympic Sports In Sports Clubs For Disabled People In Russia. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4):265-270.
[24] Makhov A.S., Medvedev I.N. Features Of Motivation Of Disabled People With Affection Of The Musculoskeletal System To Adaptive Sports. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4):367-371.
[25] Makhov A.S., Medvedev I.N. Optimizing Effect Of Static Exercises On Muscle Tone Of The Paravertebral Zone. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4):613-618.
[26] Makhov A.S., Medvedev I.N. Assessment Of The Level Of Preparedness Of Athletes With Infantile Cerebral Palsy For Adaptive Sports. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4):926-930.
[27] Medvedev IN, Kumova TA. (2008) Eprosartan effects on intravascular platelet activity in patients with arterial hypertension and metabolic syndrome. Russian Journal of Cardiology. 1(69):40-42.
[28] Medvedev IN, Amelina IV. (2009) AG polymorphism as a cytogenetic maker of arterial hypertension risk. Russian Journal of Cardiology. 2(76):70-72.
[29] Medvedev IN, Danilenko OA. (2010) Comparative effects of therapeutic complexes on vascular wall activity in patients with arterial hypertension, metabolic syndrome, and recent ocular vessel occlusion. Cardiovascular therapy and prevention. 9(7):27-32.

[30] 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

[31] Makhov A.S., Medvedev I.N. Functional State Of Muscles In Sports And Physical Training. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4): 2018; 9(4):965-968.

[32] Makhov A.S., Medvedev I.N., Mikhailova I.V., Alifirov A.I. Functional Features Of Children With Down's Syndrome Before The Start Of Classes In Football Groups. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2018; 9(4):128-133.

[33] 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.

[34] 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.

[35] 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.

[36] 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

[37] 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

[38] 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.

[39] Medvedev IN. (2018) Disaggregation Properties Of Blood Vessels In Relation To Platelets In Patients With Arterial Hypertension With Impaired Glucose Tolerance. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 9(3):1214-1219.