УДК 796.012.1 : 314.11 – 053.1

ADAPTIVE ABILITIES OF ORGANISM: GENERAL THEORETIC AND APPLIED ASPECTS

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The article presents the results of a study of the regional peculiarities cardiovascular system's functional state and adaptive capacities of population's different groups (from 7 to 55 years of different climatgeographical regions – Ukraine and Western Siberia) was carried. The analysis of experimental date, that were received at observation of Ukraine's and Western Siberia's children and adult, the essential influence of regional factor to their organism's level adaptive capacities has allowed. The shown, that independently of age, for Western Siberia's girls, maids and women the more higher adaptive potential's meanings than Ukraine's representatives are having. Among boys, youthers, men of these climatgeographical regions in majority age groups the relative equality of bloodcirculation system's adaptive possibilities was registered. Also, for Western Siberia's inhabitants, independently of sex, are having more less rate of adaptive possibilities relative reduction. More higher adaptive capacities of Western Siberia's representatives are combined, probably, with more wide composition adaptive subprograms in structure adaptive potential of strategic prescription, the formation of which was result of cooperation genetic determinated adaptive potential of population, migrated to this region, with it's climatgeographical and social-economic conditions.

Key words: adaptation, adaptive capacities, cardiovascular system, regional peculiarities, general adaptive potential, adaptatiogenesis, age, sex, population, donosological diagnostics, health state.

АДАПТИВНІ МОЖЛИВОСТІ ОРГАНІЗМУ: ТЕОРЕТИЧНІ ТА ПРИКЛАДНІ АСПЕКТИ

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У статті наведено дані щодо вивчення регіональних особливостей функціонального стану та адаптивних можливостей серцево-судинної системи різних груп населення (від 7 до 55 років двох різних кліматогеографічних регіонів – Україна та Західний Сибір). Аналіз експериментальних даних, одержаних при обстеженні дітей і дорослих України і Західного Сибіру дозволив констатувати суттєвий вплив регіонального фактору на рівень загальних адаптивних можливостей їхнього організму. Виявилося, що, незалежно від віку, для дівчаток, дівчат та жінок Західного Сибіру було характерно більш значні розміри адаптаційного потенціалу в порівнянні з представницями України. Серед хлопчиків, юнаків та чоловіків вказаних кліматогеографічних регіонів у більшості вікових груп спостерігалася відносна рівність адаптивних можливостей системи кровообігу. Разом в тим, темпи відносного зниження адаптаційних здатностей у рамках окремої групи були, незалежно від статі, суттєво нижче у мешканців Західно-Сибірського регіону. Більш високі адаптивні можливості представників Західного Сибіру пов'язані, на нашу думку, с більш широким набором адаптивних підпрограм, які складають основу їхнього стратегічного адаптаційного потенціалу (Апс), формування якого стало результатом взаємодії генетично детермінованого адаптаційного потенціалу населення, яке мігрувало до вказаного регіону з його кліматогеографічними та соціально-економічними умовами.

Ключові слова: адаптація, адаптивні можливості, серцево-судинна система, регіональні особливості, загальний адаптаційний потенціал, адаптаціогенез, вік, стать, групи населення, стан здоров'я.

АДАПТИВНЫЕ ВОЗМОЖНОСТИ ОРГАНИЗМА: ОСНОВНЫЕ ТЕОРЕТИЧЕСКИЕ И ПРИКЛАДНЫЕ АСПЕКТЫ

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В статье представлены результаты изучения региональных особенностей функционального состояния и адаптивных возможностей сердечно-сосудистой системы различных групп населения (от 7 до 55 лет двух различных климатогеографических регионов – Украина и Западная Сибирь). Анализ экспериментальных данных, полученных при обследовании детей и взрослых Украины и Западной Сибири, позволил констатировать существенное влияние регионального фактора на уровень общих адаптивных возможностей их организма. Оказалось, что независимо от возраста, для девочек, девушек и женщин Западной Сибири были характерны более высокие значения адаптационного потенциала, чем для представительниц Украины. Среди мальчиков, юношей и мужчин данных климатогеографических регионов в большинстве возрастных групп было отмечено относительное равенство адаптивных возможностей системы кровообращения. Вместе с тем, темпы относительного снижения адаптационных способностей в рамках отдельной возрастной группы были, независимо от пола, существенно ниже у жителей Западно-Сибирского климатогеографического региона. Более высокие адаптивные возможности представителей Западной Сибири связаны, вероятно, с более широким набором адаптивных подпрограмм, составляющих основу их стратегического адаптационного потенциала (Апс), формирование которого стало результатом взаимодействия генетически детерминированного

адаптационного потенциала мигрировавшего в данный регион населения с его климатогеографическими и социально-экономическими условиями.
Ключевые слова: адаптация, адаптивные возможности, сердечно-сосудистая система, региональные особенности, общий адаптационный потенциал, адаптациогенез, возраст, пол, микропопуляционные группы населения, донозологическая диагностика, состояние здоровья.

PROBLEM STATEMENT. ANALYSIS OF RECENT RESEARCHES AND PUBLICATIONS

One of the most important social characteristics of any society is the level of development of medicine, health care system and state of health of different groups of population which make up this society [1, 7, 10].

The situation in this sphere is rather unfavorable nowdays: the quantity of cases of illness of main adaptive systems has considerably increased, the degree of seriousness has also grown. The systems affected are breathing organs, circulation of the blood, blood, blood-producing organs. The frequency of mental disorders, endocrine illness, congenital abnormalities, disorders in psychical and physical development has risen. The birth-rate has fallen and the death-rate has grown among different categories of population.

One of the reasons for this situation is objectively existing disparity between the adaptive abilities of the organism and the force of external influence which causes the abrupt growth of functional tension, the rise of so-called „price" of the adaptation and, in a series of cases, its breakdown, appearance and development of various illness [2, 5, 6]. Everything mentioned above shows that now in medicine and biology the experimental research aimed at studying the peculiarities of the adaptatiogenesis process, defining the most critical periods of considerable decrease of adaptive abilities of the organism, applying the means of quick rehabilitation are especially actual. In such research great importance is attributed to the problem of elaboration of objective methods of express-estimation of adaptive abilities of organism or its adaptation potential.

Despite certain achievements in this direction, the question of quantitative estimation of adaptive abilities of different, according to socio-biological characteristics, microgroups of population stays, as well as earlier, one of the prospective questions in the sphere of general theory and practice of adaptation. The complexity of the practical resolution of the problem is brought about by the fact that besides the ecological and socio-economic factors, the general level of adaptive abilities of organism is greatly influenced by the climate and geography of the region where the representatives of various microgroups of population were born, where they are living or migrating [3, 8, 10].

It is obvious that the elaboration of appropriate scales of adaptation potential which will take into account the age, the sex, social peculiarities of different groups of people, regional conditions of living, will allow to create the real system of quick controlling adaptive abilities of organism, defining critical periods of their decrease, it will also contribute the growth of effectiveness of the rehabilitation means applied and consequently it will help to reduce the degree of functional tension of the organism and to bring down the general level of falling ill [4, 9, 10].

The fact that the problem is actual, insufficiently studied and practically significant was the stimulus for theoretical interpretation of certain questions as general theory of adaptation, for carrying out the experimental research which study age, sexual and regional peculiarities of adaptive abilities of one of the main adaptive system of an organism (cardio-vascular system) for elaboration and experimental approbation of new methods of estimation of current adaptive abilities.

MATERIALS AND METHODS OF RESEARCH

In the course of present research we carried out the medical examination of 3570 children of school age (1830 boys and 1920 girls) and 1632 employees of industrial enterprises (831 men and a 801 woman) two regions of CIS (Ukraine and Western Siberia), which differ in geographic and climatic characteristics. All the school-children were divided into 12 age groups from 7 to 18 years. Among the employees 6 age groups were formed (20-25 years, 26-30 years, 31-35 years, 36-40 years, 41-45 years, 46-55 years).

During the mass examinations adaptive potential of cardio-vascular system (Apcvs, absolute unit, a.u.). of every person who took part in the experiment was registered according to methods worked out by the authors the present work.

RESULTS OF THE RESEARCH AND THEIR DISCUSSION

The analysis of age dynamics of adaptive abilities of blood-circulation apparatus of the school age children and adult population of climatically and geographically different regions but of the same sex allowed to draw certain conclusions.

The results of the showed that dynamics of change in adaptive abilities of cardio-vascular system of boys and men from Ukraine and Western Siberia was practically the same (picture 1).

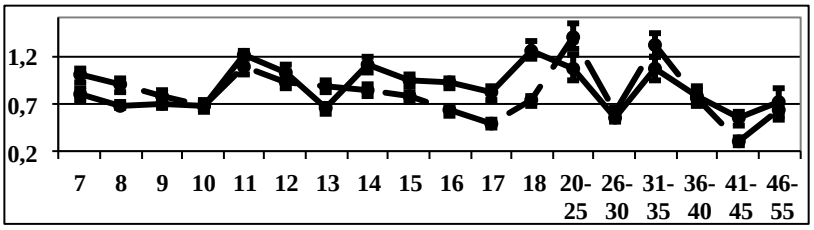

Fig. 1.The age dynamics of adaptive abilities of cardio-vascular system of an organism of boys and men from Ukraine and Western Siberia in age range from 7 to 55 years. ---- Ukraine; ___ Western Siberia

Among the school age children the fall of adaptive abilities of blood-circulation apparatus when they are 7-10 years old is accompanied by the abrupt rise till 11 years. The next fall is at the age of 13 and 17, the rise takes place at the age of 18. The exception was the period between 13 and 14 years, but bearing in mind that there are no statistically probable changes of adaptive potential of the boys of Ukraine at this age, one may admit that the dynamics of adaptive abilities of representatives of different regions is similar.

The age variations of adaptive potential of blood circulation system, synchronous enough, were also traced among the men of Ukraine and Western Siberia.

Identical character of changes of adaptive abilities of men of Ukraine and Western Siberia which doesn't depend on region was registered in the age range from 20 to 55 years, and the periods of considerable decrease of adaptive abilities of cardio-vascular system for all the men examined in both regions were the period between 26 and 30 years and between 41 and 45 years.

Age changes of adaptive potentials of girls from Ukraine and Western Siberia were similar in primary school age, secondary school age and senior age (picture 2).

Among the women age changes adaptive potential of cardio-vascular system which were analogous to each other were registered during the whole age range from 20 to 55 years. Irrespective of the region, the most considerable deterioration of adaptive abilities of blood-circulation system is observed at the period of puberty of girls from both regions (from 12 to 14 years) and also in the age groups of 26-30 –year-old and 41- 45 – year-old women.

It is necessary to remark that age groups of 26-30-year-old and 41-45-year-old people were the periods of obvious decrease of adaptive abilities of mature organism irrespective of sex and region. Moreover, the analysis of age dynamics of adaptive abilities of cardio-vascular system of the representatives of different sexes allowed to establish the fact that in maturity (older than 20 years) the nature of change of adaptive abilities of blood circulation apparatus doesn't depend on the sex.

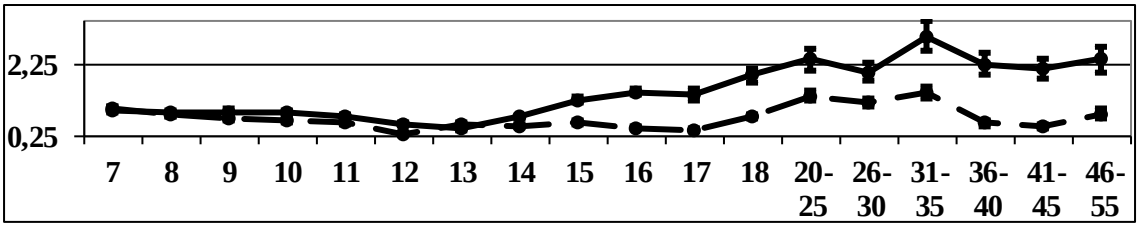

Fig. 2. The age dynamics of adaptive abilities of cardio-vascular system of an organism of girls and women from Ukraine and Western Siberia in age range from 7 to 55 years. ---- Ukraine; ___ Western Siberia

Present materials along with those given before are a convincing evidence of the fact that process of age formation of adaptive abilities of blood circulation system of organism doesn't depend on region, and maturity it doesn't depend on sex, and it is one of the unquestionable regulatory of the ontogenetic development of organism.

Besides the independence of process of formation of adaptive abilities of cardio-vascular system in ontogenesis which was registered in the course of research, we marked the regional differences in adaptive abilities of blood circulation apparatus of examined people from Ukraine and Western Siberia (table 1).

The average level of adaptive abilities of boys from Western Siberia in age range from 7 to 18 years was 0,904±0,007 a.u. and obviously exceeded the corresponding figure registered among the boys from Ukraine (0,815±0,006 a.u.). It is provided that among the girls the average level of adaptive abilities of cardio-vascular system of the representatives of Siberia was statistically a lot higher than the Ukrainians had (1,029±0,014 a.u. to 0,634±0,006 a.u. accordingly).

We will remark that the schoolgirls from Western Siberia had the highest adaptive potential among all the examined children, they were followed by boys from Ukraine and Western Siberia, the lowest potential registered among the Ukrainian girlies.

Table 1 – The average level of adaptation potential of cardio-vascular system of an organism of examined people from Ukraine and Western Siberia who belong to different age groups, are of different sexes M±м)

№	Schoolchildren (from 7 to 18 years)			
1	boys of Ukraine	boys of Western Siberia	girls of Ukraine	girls of Western Siberia
	0,815±0,006	0,904±0,007***	0,634±0,006	1,029±0,014***
2	Representatives of adult population (from 20 to 55 years)			
	men of Ukraine	men of Western Siberia	women of Ukraine	women Western Siberia
	0,840±0,021	0,795±0,012	0,99±0,16	2,28±0,18***

Note: * - $p < 0,05$; ** - $p < 0,01$; *** - $p < 0,001$ – regional differences between the representatives of the same sex.

The data obtained during the examination of adult population were practically the same. As among the schoolchildren, the average level of adaptive abilities of women from Western Siberia at the age of 20-55 years (2,28±0,18 a.u.) was certainly higher than the average level of the Ukrainians of the same age (0,99±0,16 a.u.).

We should admit that statistically significant differences between men from Ukraine and Western Siberia of the age from 20 to 55 years according to this parameter was not registered (0,840±0,021 a.u. and 0,795±0,012 a.u. accordingly).

Thus, the analysis of experimental data obtained in the course of examination of children of school age and of adult population from Ukraine and Western Siberia allows to establish the considerable influence of climate and geography on the level of general adaptive abilities of an organism, the character of intersexual and interregional correlations according to this parameter.

The given materials have generally proved the hypothesis which we brought forward earlier. It stated that adaptive abilities are genetically determined. As result the region is the dominating factor while defining the general adaptive potential of the an organism; this is provided by the fact that the representatives of more heterogeneous population and of the region which is more extreme as to climate and geography (the region is Western Siberia) were characterized by higher adaptive abilities of organism. Obviously, because of wider set of adaptive subprogrammes which were formed as a result of high migrative mobility of Siberian population, natural extremity of Western Siberia and existence of hereditary adaptive abilities which are passed from woman to woman in Western Siberia the female representatives of this region left the boys and men from same region behind as to the level of adaptive abilities in almost all cases. At the same time men and women from Ukraine who belonged to the same age groups were characterized by equality which is connected, perhaps with the relatively identical set of adaptive subprogrammes which were formed to suit Ukrainian region which is less extreme in geography and climate and to match more settled life of the population.

CONCLUSIONS

Thus, the analysis of the received experimental data allowed to state confidently enough that the general amount of adaptive abilities of blood circulation system is mostly defined by region of living which influences greatly the quantity of adaptive subprogrammes formed by organism which constitute in their turn the structure of strategic adaptive potential. At the same time, the age dynamics of adaptive abilities of organism is undoubtedly, its genetically determined characteristic.

LITERATURE

1. Aghajanian N.A. The era of the global synergies and survival concept. Modern approaches to diagnostics and rehabilitation ecology diseases // Actual problems of ecology Medical / Abstracts of the 1st Russian scientific-practical conference. – Eagle, 1998. – P. 45-49.
2. Beelev I.M., Smith D.I., Oaklev E.H.N. Environment hazards and health // Brit. Med. Bull. – 1993. – N.2 (49). – P.305-325.
3. Benetos A., Safar M., Rudnichi A., Smulyan H., Richard] L., Ducimetiere P. Et al. Pulse pressure, a predictor of long – term cardiovascular mortality in a French male population // Hypertension. – 1997. – V.30. – N.1410. – P.15.
4. Bittel J. H. M. Different Types of General Cold Adaptation in man // Internat. J. Sport. Med. – 1992. – V. 13. – P.171.
5. Gilinsky M. A. Psychoemotional stress and adaptation to cold // Constit. Congress Internat. Soc. Pathophysiology. – Moscow. – 1991. – P.259.
6. Gruijl F.R. Health effects from solar UV radiation // Radiat. Prot. Dosim. – 1997. – N.3-4 (72). – P.177-196.
7. Jansky L., Vybiral S., Ianakova H. Et al. Human adaptability to cold // I. Physiol. Proc. – 1998. – 511. – P.2-3.
8. Krivohlavy I. Adaptace a zvladani nadlimitnich zatezi // Cas. Lek. Csk. – 1998. – N. 20 (127). – P.612-615.
9. Malikov N.V. Adaptation: the problem, hypotheses, experiments. Zaporozhye: Publishing House of the Zaporozhye State University, 2001. – 370 p.
10. McEwen B. S., Stellar E. Stress and Individual. Mechanisms Leading to Disease // Arch. Intern. Med. – 1993. – V.153. – N.18. – P.2093-2101.

УДК 616.28-008.13/.14:373.3

ДО ПИТАННЯ ФІЗИЧНОЇ ПІДГОТОВЛЕНОСТІ МОЛОДШИХ ШКОЛЯРІВ ІЗ ДЕПРИВАЦІЄЮ ЗОРУ В ПРОЦЕСІ ФІЗИЧНОГО ВИХОВАННЯ

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Наведено оцінку фізичної підготовленості дітей 6-10 років із депривацією зору (ДЗ) у процесі фізичного виховання спеціальної школи-інтернату. Мета: дослідити розвиток фізичних якостей дітей молодшого шкільного віку з депривацією зору (ДЗ) спеціальної школи-інтернату в процесі фізичного виховання. Вивчено завдання дослідження**:** охарактеризувати силові якості школярів 6-10 років із ДЗ та провести їх порівняльний аналіз з аналогічними показниками практично здорових однолітків. Матеріал: у дослідженнях взяяли участь