УДК 616.12–005.8–072.7

Ohromy G.
MD, Senior Fellow, Professor, Department of Physical Education,
Sport and Health, SHEE Ukrainian State University of Chemical Technology,
Professor, Department of General Psychology, University of Dnepropetrovsk
University for the Humanities
e-mail: ogv3@mail.ru
Kasiuha O.
Competitor, SHEE Ukrainian State Chemical Technology University
e-mail: sashakasyuga@gmail.com

ALTERNATIVE TO GENETIC, PSYCHOPHYSIOLOGICAL METHODOLOGY OF DETERMINATION PREDISPOSITION TO PHYSICAL ACTIVITY AND SPORTS

In this research, the historical aspect analysis of the scientific literature on the proper approach to the selection of optimal individual for employment sport. The results of the leading scientists of the world, which revealed that a predisposition to specific sports can be determined by genetic studies of the structure DNA. Genetics allows you to define since infancy, the best sport for a child. Of course, there is no gene of boxer or swimmers. But there is a set of genes that predispose to increased flexibility, speed, strength or endurance. These three factors — the basis of almost every individual sport. And according to the degree of predisposition to them, you can determine what type fits more. Not produce the desired result, if the athlete is not genetically predisposed to this type of sport. Laboratories providing genetic passport athlete, now appearing worldwide. Depending on a person is a professional or beginners who still need to define the sport, it is necessary to analyze complex spectra genes. The accuracy of this study, according to scientists, hovers around 60–70 %. Costly research, financial opportunities do not always allow him to perform, especially in rural areas. Therefore, we have developed, scientifically sound, additional, alternative methodologies for determination of individual reserve capacity of the organism and exercise tolerance on psychomotor performance properties of the nervous system. Developed evaluation criteria in terms of the lability of the nervous system — the rate of reaction to the load strength of the nervous system — the ability to keep the pace of work. Models methodologies presented in this article (Patent for useful model № 75615 from 10.12.2012 and utility model patent № 77886 from 25.02.2013).
Key words: psychophysiology, exercise tolerance criteria, genetic predisposition.

Relevance of the work is not in doubt, as for many parents the choice of the sport for a child is very relevant. World's leading scientists believe that a predisposition to specific sports can now be identified through genetic studies of the structure of DNA [4].

During the experiments, the researchers found that in the reaction of the organism to form the load level and the recovery process involving about 20 genes of the DNA structure. Therefore, the choice of the form of sports load

is very important. Not produce the desired result, if the athlete is not genetically predisposed to the sport [7; 8].

According to scientific literature, most people have genetically inherited the average level of motor activity, prone to sports only 7 % of the population. Very high rate of motor activity revealed only 0.07 % of the population, ie 7 per 100 thousand. They can be attributed to natural talent, they are the most suitable media complex genes [1; 7].

Genetics allows you to define very precisely since infancy, the best sport for a child. About genetics in sport scientists started talking when opened more than 200 human genes, 34 of which, in their opinion, the most demonstrative. «Of course, there is no gene boxer or swimmers. But there is a set of genes that predispose to increased flexibility, speed, strength or endurance» [7–9]. These three factors — the basis of almost every individual sport. And according to the degree of predisposition to them, you can determine what type fits your child more. Laboratories providing genetic passport athlete, now appearing worldwide. This trend is growing rapidly in China and England. In Belarus, genetic research novice professional athletes has become a legal requirement [4].

Depending on a person is a professional or beginners who still need to define the sport, it is necessary to analyze complex spectra genes.

However, the latest figures of the leading scientists in the world rely on the results of DNA analysis is not worth too much is not yet known. The accuracy of this study, in their opinion, has hovered at 60–70 %. Even if scientists provide absolute data, it is not guaranteed to result in [8].

Ukraine also operate genetic laboratory officially perform analysis to determine gene complex. Costs of research: 3000 hryvnia for complete analysis (34 genes) and 500 hryvnia — incomplete analysis (3 genes). Smear sample is taken from the inside of the cheeks, it can be mailed. And 10 days later to get a conclusion about the genetic passport [10].

Given the factor of informativeness and financial opportunities that do not always allow to perform this study, especially in rural areas. We set a goal to develop additional or alternative methodologies for determining predisposition to sport and exercise based on tolerance on psychomotor performance properties of the nervous system.

Materials and methods. The study was conducted on the bases of the Ukrainian State University of Chemical Technology and Humanities University of Dnipropetrovsk. The survey was attended by students I — II courses of all faculties. The sample of 1120 persons: the girls — 440 boys — 680, respectively. Of the total surveyed, the primary group — people in 1008, the preparatory — 22, a special medical team — 90, respectively. As the main method used technique for diagnosing nervous system properties on psychomotor performance Ilin E. P. modified Ohromy G. V. Studied changes in indicators lability of the nervous system (LNS) — the rate of reaction to the load strength of the nervous system (SNS) — the ability to keep the pace of [5; 6].

Defining the properties of the nervous system is of great importance in theoretical and practical studies. Many of laboratory diagnostic methods the

basic properties of the nervous system require special equipment and conditions of the labor-intensive. This technique is superior to express diagnostics «Tapping-Test» applied by us in this study for the selection of individual dosage loads the selected respondent sport and determine tolerance to stress on psychomotor performance properties of CNS — lability and strength. Technique is safe, easy and short-lived in the implementation takes into account the psychophysiological status at the time of the study, the possibility of standardizing the conditions of the data and mass and individual to compare the results with repeated trials.

The studies revealed:

1. After physical exertion (PE) (warm-up and run 1km) in more than half of respondents (60 %) had high LNS (9 ± 1 point), which corresponded to high and very high tolerance to PE = 100 %. Difference of lability (DL) of these respondents ranged in the range of (1) to (-4) points, which indicates a good fitness students.

2. High tolerance to PE (> 75 %), DL = 0, had 1/10 the proportion of students (for this category adequately matched load).

3. 1/10 the proportion of students had low exercise tolerance (36–50 %). Reserve capacities they reduced. This contingent of respondents needs individual selection exercise. In our opinion, the volume of motor mode does not match the criteria of the threshold load, if received indicators remain at the same level. This PE load in our opinion somewhat overstated and will not increase the tolerance, such persons should be in special medical groups (except LNS = 10 points when DL = 0).

Growth indicators of lability and strength of the nervous system with repeated measurement testified correct selection mode PE.

Growth performance of LNS and reduced of SNA with repeated measurement indicates the correct selection mode of exercise. However, the reserve capacity of the organism is very low. Such persons in our opinion should be special medical groups.

With unchanged or reduced of LNS and growth index of SNA with repeated measurements in our opinion, evidence of right conduct and good physical rehabilitation reserve possibilities of the body.

Based on these data, we have developed scientifically sound, optimized new methodology for determining the tolerance to stress for students (utility model patent number 75615 from 10.12.2012 and utility model patent number 77886 from 25.02.2013).

Developed model «Method of determining human tolerance to stress» on the difference of lability are unified and can be applied to the definition of tolerance and physical stress (table number 1).

To determine the tolerance to physical loads on the main horizontal scale models determine baseline lability of the nervous system in the test scores using «Tapping-test». After a given physical activity carried out follow-up study of the nervous system lability test (using «Tapping-test») and by determining the lability of the nervous system in points, find value in the vertical column corresponding to the first indicator. Determine the difference between

the baseline lability index and after exercise by substituting the parameters in the horizontal and vertical column, respectively. Based on these factors determine the tolerance to physical exertion.

Example. Carry out «Tapping-test». Indicator lability of the nervous system to the load — 156 points. By main scale model «Method of determining human tolerance to stress» is defined baseline lability of the human nervous system, equal to — 3 points (156 dots). After exercise is carried out repeatedly «Tapping-test». Indicator lability of the nervous system after exercise — 178 dots. The vertical scale in the first indicator (156 dots, 3 points) define indicator lability human nervous system after exercise equal — 5 points (178 dots). Correlate human lability of nervous system before and after physical load on a scale determined by the index of tolerance tolerance, it is equal to DL<0. Conclusion: exercise tolerance is high 86–100 %.

Model helps determine the speed of reaction to mental and physical stress in the educational process, the switching speed of the attention of students on various activities in learning environments in higher education.

Determine the tolerance of students to physical stress by index of **LNS** and **SNS** can and our model (Table number 2) **«Method for determining the physical human endurance»**. In the model of two scales : the left and right scale lability of the nervous system, inside — the scale of nervous system strength and performance of physical activity due in watts (W).

To determine exercise tolerance is diagnosed properties of the nervous system of humans on psychomotor performance by «Tapping-test».

Modeled find lability score score nervous system and nervous system strength. At the intersection of performance and power LNS and SNS define threshold physical load in watts. The corresponding figures for the cycle ergometer.

Example. Carry out diagnosis of nervous system by using «Tapping-test». Indicator lability of the nervous system — 7 points (187 dots), the index of nervous system strength — 3 points. Using model «Method for determining the physical human endurance» find correspondence between the scale and the scale of the lability of nervous system strength. Get the result — the threshold load — 298 watts. You can define the deviation from the mean: median of LNS — 5 points, the mean of SNS — 5 points, the load on the intersection — 330 watts. The difference 330–298 = 32 W, the deficit threshold of physical activity 32 watts.

The proposed model allows to determine the physical endurance of a person based on determination of the average values of the lability and strength of the nervous system. Model can be used in the selection of individual dosage exercise and determining threshold exercise.

Physical activity — the most effective means to influence health and human performance that proved the works of many researchers. Even in a crisis of ecological conditions and regular physical exercise, recreational mild to moderate intensity contribute to the functionality of the cardiovascular system, including the cerebral circulation, which leads to increased productivity of intellectual activity.

Table 1

Model «Method of determining human tolerance to stress»

													1	**Lability of the nervous system before load**	DL>1	36-50%
												1	2		DL>1	36-50%
											1	2	3		DL>1	36-50%
										1	2	3	4		DL>1	36-50%
									1	2	3	4	5		DL>1	36-50%
								1	2	3	4	5	6		DL>1	36-50%
							1	2	3	4	5	6	7		DL>1	36-50%
						1	2	3	4	5	6	7	8		DL>1	36-50%
					1	2	3	4	5	6	7	8	9		DL=1	51-70%
				1	2	3	4	5	6	7	8	9	10		DL=0	71-85%
		Lability of the nervous to stress	**1** >75 **1**	**2** >129 **2**	**3** >151 **3**	**4** >162 **4**	**5** >172 **5**	**6** >183 **6**	**7** >195 **7**	**8** >204 **8**	**9** >210 **9**	**10** <210 **10**	**Lability of the nervous system to stress**		
71-85%	DL=0	**Lability of the nervous system after load**	1	2	3	4	5	6	7	8	9	10			
86-100%	DL<0		2	3	4	5	6	7	8	9	10				
86-100%	DL<0		3	4	5	6	7	8	9	10					
86-100%	DL<0		4	5	6	7	8	9	10						
86-100%	DL<0		5	6	7	8	9	10							
86-100%	DL<0		6	7	8	9	10								
86-100%	DL<0		7	8	9	10									
86-100%	DL<0		8	9	10										
86-100%	DL<0		9	10											
86-100%	DL<0		10												

DL>1	Low tolerance to stress	**36-50%**
DL=1	Moderately low tolerance to stress	**51-70%**
DL=0	Saved tolerance to stress	**71-85%**
DL<0	High tolerance to stress	**86-100%**

*DL — Difference of lability

Table 2

Model «Method of determination the physical endurance»

Lability of the nervous system	**The strength of the nervous system**										**Lability of the nervous system**
1 point <74 dots	**1 point** 66 W	**2 points** 107 W	**3 points** 148 W	**4 points** 189 W	**5 points** 230 W	**6 points** 271 W	**7 points** 312 W	**8 points** 353 W	**9 points** 394 W	**10 points** 435 W	**1 point** <74 dots
2 points 75-129 dots	**1 point** 91 W	**2 points** 132 W	**3 points** 173 W	**4 points** 214 W	**5 points** 255 W	**6 points** 296 W	**7 points** 337 W	**8 points** 378 W	**9 points** 419 W	**10 points** 460 W	**2 points** 75-129 dots
3 points 130-151 dots	**1 point** 116 W	**2 points** 157 W	**3 points** 198 W	**4 points** 239 W	**5 points** 280 W	**6 points** 321 W	**7 points** 362 W	**8 points** 403 W	**9 points** 414 W	**10 points** 485 W	**3 points** 130-151 dots
4 points 152-162 dots	**1 point** 141 W	**2 points** 182 W	**3 points** 233 W	**4 points** 264 W	**5 points** 305 W	**6 points** 346 W	**7 points** 387 W	**8 points** 428 W	**9 points** 469 W	**10 points** 510 W	**4 points** 152-162 dots
5 points 163-172 dots	**1 point** 166 W	**2 points** 207 W	**3 points** 248 W	**4 points** 289 W	**5 points** 330 W	**6 points** 371 W	**7 points** 412 W	**8 points** 453 W	**9 points** 494 W	**10 points** 535 W	**5 points** 163-172 dots
6 points 173-183 dots	**1 point** 191 W	**2 points** 232 W	**3 points** 273 W	**4 points** 314 W	**5 points** 355 W	**6 points** 396 W	**7 points** 437 W	**8 points** 478 W	**9 points** 519 W	**10 points** 560 W	**6 points** 173-183 dots
7 points 184-195 dots	**1 point** 216 W	**2 points** 257 W	**3 points** 298 W	**4 points** 339 W	**5 points** 380 W	**6 points** 421 W	**7 points** 462 W	**8 points** 503 W	**9 points** 544 W	**10 points** 585 W	**7 points** 184-195 dots
8 points 196-204 dots	**1 point** 241 W	**2 points** 282 W	**3 points** 323 W	**4 points** 364 W	**5 points** 405 W	**6 points** 446 W	**7 points** 487 W	**8 points** 528 W	**9 points** 569 W	**10 points** 610 W	**8 points** 196-204 dots
9 points 205-210 dots	**1 point** 266 W	**2 points** 307 W	**3 points** 348 W	**4 points** 389 W	**5 points** 430 W	**6 points** 471 W	**7 points** 512 W	**8 points** 553 W	**9 points** 594 W	**10 points** 635 W	**9 points** 205-210 dots
10 points >210 dots	**1 point** 291 W	**2 points** 332 W	**3 points** 373 W	**4 points** 414 W	**5 points** 455 W	**6 points** 496 W	**7 points** 537 W	**8 points** 578 W	**9 points** 619 W	**10 points** 660 W	**10 points** >210 dots

Already once Exercising improves the functional status and well-being of a person experiencing a motor «hunger», and this improvement affects all body systems. Undoubtedly increase the functional status of the various systems of the body leads to the improvement of its adaptive capacity and to increase the level of efficiency of the immune system. Physical activity is a powerful factor against mental fatigue, psychological and emotional tension and stress situations that are known to accompany the study of the students at the university. After all, according to many researchers, predisposition to coronary heart disease, atherosclerosis, various neuroses, gastrointestinal diseases occurs in adolescence and young age. Hence the need to advance «program» students on maintaining the health and high ability to work both during university studies and after graduation. One of the significant factors in promotional solution to this problem may be an example of the level of health of those students who regularly engage in physical activity, that is, attending sports recreation and wellness section [1–3].

Conclusions and prospects for further development in this direction:

❖ Introduction of new methodologies developed by us, you can:

➢ to determine the speed of adaptation and adequate response to the load on the physical education students and athletes;

➢ to determine the level of physical endurance ;

➢ to monitor the efficiency and effectiveness of selected loads.

❖ Selection of individual metered loads with the gradual expansion of the motor mode, in our opinion, have a positive impact on the results of physical education and sport, will help avoid complications and sudden deaths during class.

Список використаних джерел і літератури

1. Апанасенко Г. Л. Книга о здоровье. — Киев: Медкнига, 2007. — 132 с.
2. Фізична культура і здоров'я людини: історія, сьогодення, майбутнє (до 100-річчя першого київського диплома культурі): матер. Міжнар. наук.-практ. конфер., 18–19 жовт. 2012 р. / М-во осв. і науки, молоді та спорту України, Київ. Ун-т ім. Б. Грінченка, Ін-т спец. педаг. НАПН України, Благод. фонд сприян. розв. осв. ім. Б. Грінченка; — К.: Київ. Ун-т ім. Б. Грінченка, 2012. — 340 с.
3. Цільова комплексна програма «Фізичне виховання — здоров'я нації»: Затверджено Указом Президента України від 1 вересня 1998 року № 963/98 (963/98) [Електронний ресурс]. — Режим доступу: http://zakon2.rada.gov.ua/laws/show/963 %D0 %B0/98
4. Спортивная генетика. Учебное пособие / Сологуб Е. Б., Таймазов В. А. — 2000. — 127 с.
5. Пат. 75615 Україна, МПК A61B 5/16 (2006.01)/ u 2012 05608/ Спосіб визначення толерантності людини до розумових навантажень/ Охромій Г. В., Ноздрін С. В.; Власник Державний вищий навчальний заклад «Український державний хіміко-технологічний університет» — № 75615; заявл. 07.05.2012; опубл. 10.12.2012 Бюл. № 23.
6. Пат. 77886 Україна, МПК A61B 5/16 (2006.01); A61B 5/22 (2006.01)/ u 2012 05608/ Спосіб визначення фізичної витривалості людини / Охромій Г. В., Макарова Н. Ю., Ноздрін С. В.; Власник Державний вищий навчальний заклад «Український державний хіміко-технологічний університет» — № 77886; заявл. 01.10.2012; опубл. 25.02.2013 Бюл. № 4.
7. Genetic and Molecular Aspects of Sports Performance. Bouchard C. & Hoffman E. P. — 2011. — 424 p.
8. Genetics Primer for Exercise Science and Health / Roth S. M. — 2007. — 192 p.

9. Health and health Behavior among Young people. WHO Policy Series: Health policy for children and adolescents issue/International report editor C. Currie, K. Hurrelman / Copenhagen WHO, Regional Office for Europe, 2009. — 132 p.
10. Costs of Genetic Testing [Електронний ресурс]. — Режим доступу: http://www.testdnk.com.ua.

References

1. Apanasenko H. L. Knyha o zdorov'e. — Kyev: Medknyha, 2007. — 132s.
2. Fizychna kul'tura i zdorov'ya lyudyny: istoriya, s'ohodennya, maybutnye (do 100-richchya pershoho kyyivs'koho dyploma kul'turi) : metr. Mizhnar. nauk.-prakt. Konfer.,18–19 zhovt. 2012r. / M-vo osv. I nauky, molodi ta sportu Ukrayiny,Kyyiv. Un-t im. B. Hrinchenka, In-t spets. pedah. NAPN Ukrayiny, Blahold. fond spryyan. Rozv.osv. im. B. Hrinchenka; — K.:Kyyiv. Un-t im. B. Hrinchenka,2012. — 340 s.
3. Tsil'ova kompleksna prohrama «Fizychne vykhovannya — zdorov'ya natsiyi»: Zatverdzheno Ukazom Prezydenta Ukrayiny vid 1 veresnya 1998 roku N 963/98 (963/98). — [Elektronnyy resurs]. — Rezhym dostupu: http://zakon2.rada.gov.ua/laws/show/963%D0%B0/98
4. Sportyvnaya henetyka. Uchebnoe posobye. Solohub E. B., Taymazov V. A. 2000. — 127s.
5. Pat. 75615 Ukrayina, MPK A61V 5/16 (2006.01)/ u 2012 05608/ Sposib vyznachennya tolerantnosti lyudyny do rozumovykh navantazhen'/ Okhromiy H. V., Nozdrin S. V.; Vlasnyk Derzhavnyy vyshchyy navchal'nyy zaklad «Ukrayins'kyy derzhavnyy khimiko-tekhnolohichnyy universytet» — #75615; zayavl. 07.05.2012; opubl. 10.12.2012 Byul.#23
6. Pat. 77886 Ukrayina, MPK A61V 5/16 (2006.01); A61V 5/22 (2006.01)/ u 2012 05608/ Sposib vyznachennya fizychnoyi vytryvalosti lyudyny / Okhromiy H. V., Makarova N.Yu., Nozdrin S. V.; Vlasnyk Derzhavnyy vyshchyy navchal'nyy zaklad «Ukrayins'kyy derzhavnyy khimiko-tekhnolohichnyy universytet» — #77886; zayavl. 01.10.2012; opubl. 25.02.2013 Byul.#4
7. Genetic and Molecular Aspects of Sports Performance. Bouchard C. & Hoffman E. P. 2011. — 424 p.
8. Genetics Primer for Exercise Science and Health. Roth S. M. 2007. — 192 p.
9. Health and health Behavior among Young people. WHO Policy Series: Health policy for children and adolescents issue/International report editor C. Currie, K. Hurrelman / Copenhagen WHO, Regional Office for Europe, 2009. — 132 p.
10. Costs of Genetic Testing — [Електронний ресурс]. — Режим доступу: http://www.testdnk.com.ua.

Охромій Г. В.
д. м. н., ст. н. с., професор кафедри фізкультури, спорту та здоров'я,
ДВНЗ «Український державний хіміко-технологічний університет»
професор кафедри загальної психології,
ВНЗ «Дніпропетровський гуманітарний університет»
Касюга О. М.
ДВНЗ «Український державний хіміко-технологічний університет»

АЛЬТЕРНАТИВНІ ГЕНЕТИЧНИМ, ПСИХОФІЗІОЛОГІЧНІ МЕТОДОЛОГІЇ СХИЛЬНОСТІ ДО ФІЗИЧНИХ НАВАНТАЖЕНЬ І ВИДІВ СПОРТУ

Резюме

У роботі в історичному аспекті проведено аналіз наукової літератури з питань правильного підходу до вибору для занять індивідуального оптимального виду спорту. Представлені результати провідних учених світу, які виявили, що схильність до конкретних видів спорту можна визначити за допомогою генетичних досліджень структури ДНК. Генетика дозволяє визначати вже з дитинства оптимальний вид спорту для дитини. Зрозуміло, немає гена боксера або пловця. Але є набір генів, що обумовлюють підвищену гнучку, швидку, силу або витривалу. Ці три показники — основа практично кожного індивідуального виду спорту. І за ступенем схильності до них можна визначити, який саме вид підходить більше. Не вдасться отримати бажаного результату, якщо спортсмен генетично не схильний до даного виду спорту. Лабораторії, що надають генетичний паспорт спортсмена, зараз з'являються по всьому світу. Залежно від того, є людина професійним або починаючим спортсменом, якому ще необхідно визначитися з видом спорту, їй необхідний аналіз комплексу спектрів генів. Точність цього дослідження, на думку вчених, коливається на рівні 60–70 %. Дослідження дороге, фінансові можливості не завжди дозволяють виконати його, особливо в сільській місцевості. Тому нами були розроблені, науково обґрунтовані додаткові, альтернативні методології визначення індивідуальних резервних можливостей організму і толерантності до фізичних навантажень за психомоторними показниками властивостей нервової системи. Розроблено критерії оцінки за показниками лабільності нервової системи — швидкості реакції на навантаження, сили нервової системи — здатність утримувати заданий темп роботи. Моделі методологій представлені в статті (Патент на корисну модель № 75615 від 10.12.2012 та патент на корисну модель № 77886 від 25.02.2013).

Ключові слова: психофізіологія, фізичні навантаження, толерантність, критерії, генетична схильність.

Охромий Г. В.
д. м. н., ст. н. с., профессор кафедры Физкультуры, спорта и здоровья,
ГВУЗ «Украинский государственный химико-технологический университет»
профессор кафедры общей психологии
ВУЗ «Днепропетровский гуманитарный университет»
Касюга А. Н.
ГВУЗ «Украинский государственный химико-технологический университет»

АЛЬТЕРНАТИВНЫЕ ГЕНЕТИЧЕСКИМ, ПСИХОФИЗИОЛОГИЧЕСКИЕ МЕТОДОЛОГИИ ОПРЕДЕЛЕНИЯ ПРЕДРАСПОЛОЖЕННОСТИ К ФИЗИЧЕСКИМ НАГРУЗКАМ И ВИДАМ СПОРТА

Резюме

В работе в историческом аспекте проведен анализ научной литературы по вопросам правильного подхода к выбору для занятий индивидуального оптимального вида спорта. Представлены результаты ведущих ученых мира, которые выявили, что предрасположенность к конкретным видам спорта можно определить с помощью генетических исследований структуры ДНК. Генетика позволяет определять уже с младенчества оптимальный вид спорта для ребенка. Разумеется, нет гена боксёра или пловца. Но есть набор генов, предрасполагающих к повышенной гибкости, быстроте, силе или выносливости. Эти три показателя — основа практически каждого индивидуального вида спорта. И по степени предрасположенности к ним можно определить, какой именно вид подходит больше. Не удастся получить желаемого результата, если спортсмен не предрасположен генетически к данному виду спорта. Лаборатории, предоставляющие генетический паспорт спортсмена, сейчас появляются по всему миру. В зависимости от того, является человек профессиональным или начинающим спортсменом, которому еще необходимо определиться с видом спорта, ему необходим анализ комплекса спектров генов. Точность этого исследования, по мнению ученых, колеблется на уровне 60–70 %. Исследование дорогостоящее, финансовые возможности не всегда позволяют выполнить его, особенно в сельской местности. Поэтому нами были разработаны научно обоснованные дополнительные, альтернативные методологии определения индивидуальных резервных возможностей организма и толерантности к физическим нагрузкам по психомоторным показателям свойств нервной системы. Разработаны критерии оценки по показателям **лабильности нервной системы** — скорости реакции на нагрузку, **силы нервной системы** — способности удерживать заданный темп работы. Модели методологий представлены в статье (Патент на полезную модель № 75615 от 10.12.2012 и патент на полезную модель № 77886 от 25.02.2013).

Ключевые слова: психофизиология, физические нагрузки, толерантность, критерии, генетическая предрасположенность.

Стаття надійшла до редакції 01.06.2014