



INTERNATIONAL MEDICAL SCIENTIFIC JOURNAL

ART OF MEDICINE



Internet address: <http://artofmedicineimsj.us>

E-mail: info@artofmedicineimsj.us

11931 Barlow Pl Philadelphia, PA 19116, USA +1 (929) 266-0862

Chief Editor

Dr. Pascual Izquierdo-Egea

Prof. Dr. Francesco Albano

Dr. Catherine J. Andersen

Prof. Dr. Sandro Ardizzone

Dr. Dmitriy Atochin

Prof. Dr. Antonio Aversa

Prof. Dr. Tamam Bakchoul

Prof. Dr. Pierre-Grégoire Guinot

Prof. Dr. Rainer Haak

Prof. Henner Hanssen

Roy G. Smith

Department of Molecular and Cellular Biology/Department of Medicine

Baylor College of Medicine

Houston, TX 77030, USA

Kalpesh Patel, MD

The Sydney Kimmel Comprehensive Cancer Center

Johns Hopkins Medical Institutions

Baltimore, MD, 21231, USA

Roy G. Smith

Department of Molecular and Cellular Biology/Department of Medicine

Baylor College of Medicine

Houston, TX 77030, USA

Khamdamov Bakhtiyor Bukhara State Medical Institute

Khamdamova Mukhayokhon Bukhara State Medical Institute

Available at <https://www.bookwire.com/>

ISBN: [978-0-578-26510-0](https://www.isbn-international.org/product/978-0-578-26510-0)

FEATURES OF THE IMMUNE STATUS OF JUDO ATHLETES

¹D.A.Aliyeva, ²A.A.Sadikov

¹ Samarkand State Medical University, ² National Anti-Doping Agency of the Republic of Uzbekistan

Abstract. The article discusses the features of the state of the immune status of judoka athletes with increased sports loads in different periods (pre-competition and recovery) of preparation for competitions. The main parameters of the body's immune system were studied in a comparative aspect between a group of athletes and non-athletes.

Keywords: athletes, judo, immune status, adaptation, homeostasis.

Introduction.

The homeostasis system of athletes, its state is one of the most important in assessing the response of the body's adaptation system to the resulting increased physical stress associated with an active training process. As you know, one of the systems responsible for maintaining the balance of homeostasis in the body is the immune system, the regulation of which is carried out due to the work of the neuroendocrine system. In this regard, more attention should be paid to the study of the immunological system (IS) of the protection of the athlete's body, in order to be able to restore it after performing active physical exertion, especially among adolescents, in view of the immaturity of the body and active hormonal changes characteristic of this age period. Knowledge of the dynamics and possible changes in IS parameters will allow maintaining the homeostasis of athletes and ensuring the regulation of the adequate use of physical activity in preparation for important competitions [1,6].

The study of the patterns of functioning of IS, the pathogenetic mechanisms of its violations under the influence of various negative factors on an athlete, as well as the development of means and methods of prevention and correction are priority areas of fundamental and practical sports medicine.

IS, being the key integral and regulatory systems of the body, has been actively considered by specialists in various fields of medicine and related specialties. Currently, this has become a global medical and social problem due to the spread of immunological disorders [1,3].

The increased intensity of the training and competitive process in sports has extreme psychophysical effects on the athlete's body, which leads to serious disorders

of organs and systems [2,5,6]. As is known, the regulatory system of the body, which combines the nervous, endocrine and immune systems, is the most sensitive to increased loads [4,7]. When exposed to increased loads, IS parameters can go beyond physiological norms, causing pathological processes, which leads to an increase in morbidity, with a subsequent decrease in sports results [6]. This determines the need to control changes in the IS indicators of athletes. Numerous studies have shown [8] that the assessment of IS parameters in athletes during training and competitive training is a sensitive method for assessing the state of body resistance and the functioning of adaptive mechanisms that work under increased sports loads. Recently, issues [9,10,11] of creating an "athlete's immune passport" have been considered, which can be widely used in the practical work of sports doctors. Changes in IS indicators depend on the specifics of sports, being quite variable, which complicates the solution of the task. This provides for the need to study the IP and the status of athletes among different sports specializations with the formation of an "athlete's immune passport" separately for each sport. Given the lack of information on the activity of IS, which is not systematized by sports and by periods of training activity, it is considered necessary to conduct research in this direction. There are a few works [6,9,12] that provide data on the study of the immune status of athletes of various sports in different periods of preparation for competitions, which justifies the need for research.

Purpose of the work: assessment of the immune status of judo athletes at the stage of sportsmanship.

Material and methods. To assess the immune status of athletes, 58 male judokas were examined at different periods of the annual training plan, within one microcycle.

The studies were carried out with athletes of the youth team of the city of Tashkent, aged 14-18 years (average age 8.0 ± 1.3 years), while the first category was 41%, candidates for master of sports - 59%, all athletes trained according to a single training program. The control group with immunological studies consisted of 24 practically healthy young people of the same age who do not go in for sports.

According to generally accepted methods, studies of immunological parameters in athletes of the control and study groups were carried out. The parameters of the phagocytic link of IS, the bactericidal activity of neutrophils, the levels of CEC and Ig have been studied [4,7].

Research results. The obtained studies showed that according to the state of the phagocytic link of the IS, improvements in the absorption and digestion capacity of phagocytes in judokas were determined in comparison with healthy people who do not go in for sports (an increase in PF and PZF) within the physiological norm. The bactericidal activity of neutrophils according to the NBT test in judoists and non-

athletes did not differ and was within the physiological norm. This indicates the normal functioning of the antimicrobial systems of phagocytosis. The activity of oxygen-independent systems of bactericidal phagocytes in judoists was below the physiological norm and the values of the control group in all periods, except for the most minimal recovery period in terms of loads (Table 1).

Table 1

Indicators of the non-specific link of the immune system of judo wrestlers

Indicators of the non-specific link of the immune system	Control group	Main group		
		Preparation stage	Pre-competition stage	Restoration stage
Phagocytic index (FP), %	84.03±1.24	65.8±1.53*	66.1±1.31*	65.7±1.35*
Phagocytic number (PF), abs.	13.92±0.52	15.6±0.73*	16.2±0.91*	15.8±0.88*
Phagocytosis completion rate (PCF), %	32.64±1.29	52.3±2.44*	52.8±2.32*	51.7±1.67*
nitroblue tetrazolium (NBT) reduction test, basic, c.u.	0.13±0.02	0.13±0.06	0.14±0.03	0.13±0.05
nitroblue tetrazolium (NBT) reduction test, stimulated, c.u.	1.07±0.05	0.97±0.05	0.96±0.07	0.93±0.06
lysosomal cationic test (LCT), c.u.	1.64±0.02	1.58±0.04*	1.47±0.04*	1.61±0.07*

Note: * - p<0.05 - reliability between the indicators of the control group and the group of judokas

In a comparative analysis of the index of the circulating immune complex (CIC) of high and low molecular weight levels, they were significantly higher in judoists, in relation to the control group (Table 2).

Table 2

Comparative analysis of the levels of circulating immune complexes (CIC) in athletes

Levels of circulating immune complexes, (CIC)	Control group	Main group		
		Preparatory stage	Pre-competition stage	Recovery stage
macromolecular	23.6±1.9	53.7±2.57*	54.6±2.31*	52.4±2.45*
Medium molecular weight	75.6±3.77	76.3±4.58	75.8±4.62	73.7±4.13
Low molecular weight	157.5±6.2	203.2±7.4*	197.3±4.41*	182.8±5.78*

Note: * - p < 0.05 - significance between the indicators of the control group and judo groups

The levels of high- and low-molecular CECs in all periods of the training process were significantly higher in judokas in comparison with the control group. The levels

of medium molecular weight in the two study groups showed no significant differences.

The levels of immunoglobulins of all studied classes were within the physiological norm. The concentration of Ig M, G and A in judoists in all periods, except for the recovery period, did not differ from the values of the control group, and in the recovery period they were significantly higher in comparison with persons not involved in sports (Table 3).

Comparative analysis of immunoglobulin parameters in judokas

Table 3

Levels of immuno-globulins	Control group	Main group		
		Will prepare. stage	Precompetition. stage	Restore. stage
IgM	1.26±0.11	1.0±0.17	1.3±0.21	1.8±0.16*
IgG	11.32±0.37	8.3±0.46	8.1±0.38	12.6±0.47*
IgA	1.65±0.12	1.6±0.35	1.8±0.39	2.7±0.27*

Note: * - $p < 0.05$ - significance between the indicators of the control group and judo groups

The level of Ig M in judokas in the recovery period was 1.8 ± 0.16 , they were significant, higher than the values of the control group - 1.26 ± 0.11 . The concentration of Ig G in the main group - 12.6 ± 0.47 and Ig A 2.7 ± 0.27 during the recovery period was significantly higher compared to the control group.

The results of the study of the immunity of judoka athletes revealed that under the influence of sports loads, almost all examined patients experience changes in the indicators of the non-specific link of IS. Disturbances in the functional state of the phagocytic link are manifested both in a decrease in the absorptive capacity of phagocytes and in the inhibition of their bactericidal activity. Intensive training loads are accompanied by a decrease in the activity of phagocytosis - FI, PF, PZF of blood cells. Apparently, this is due to varying degrees of adaptability of the IS and the body of athletes to sports loads. Violations in the non-specific link of IS in the vast majority of the surveyed athletes during periods of intense training and competitive activity are logical, because. it is this link that is the first line of defense of the body. The levels of low molecular weight CECs were higher in the groups of athletes compared to the control group not involved in sports.

Conclusion. It has now been established that a violation of the elimination of low molecular weight CECs leads to the development of inflammation, and a significant relationship between an increased content of low molecular weight CECs and the occurrence of autoimmune disorders has been noted [3,4].

Thus, elevated levels of low molecular weight CECs in athletes may indicate the risk of developing autoimmune processes in them [12]. Elevated levels of Ig G and Ig A at the beginning of the preparatory period in judokas (i.e., during the period of gradual increase in loads) and an increase in Ig levels of all classes during the recovery period - the period of the lowest sports loads are associated with small volume and intensity of loads during these periods, and as a result, with a decrease in the needs of the body of athletes in it [8]. And the decrease in the amount of Ig at the stages of high psychophysical loads, respectively, is a consequence of not only the sorption mechanism, but also an increase in the need for energy and plastic material, with a deficiency of which the body begins to use the most mobile proteins of the body, including immunoglobulins [2,3,5, 6]. An increase in Ig levels at the beginning of the preparatory and especially during the recovery periods may be a consequence of an increase in the activity of B-lymphocytes due to the minimization of the load and a decrease in its suppression on B-cells [5,9,11].

Sports activity is associated with constant overloads, while the main peak of training intensity falls on the pre-competitive period. Adaptation of athletes [1,13] is provided by functional shifts, violation of homeostasis, while IS plays a special role in the formation of adaptive reactions, violations of which lead to overstrain of the body with a subsequent decrease in the body's resistance to the effects of external and internal environmental factors.

Literature

1. Alieva D.A., Sadikov A.A., Ismailova A.A., Abdumajidov M.A. The possibility of using immunological parameters as early predictors of the development of adaptation in athletes. - // J. Tibbiyot wa sport Medicine and sport , 2021/1, P .15-17.
2. . Petrushkina N.A. Immunology of sports (literature review). // Scientific and sports bulletin of the Urals and Siberia. - 2019. - No. 3(23). - S. 21-37.
3. Borges GF Variation in plasma cytokine concentration during a training season in elite kayakers. // The journal of sports medicine and physical fitness. -2018. - Vol. 58 , No. 10. - R. 1519-1524.
4. Cerqueira E. Inflammatory effects of high and moderate intensity exercise: a systematic review. // Frontiers in physiology. - 2020. - Vol. 9, No. 10. - R. 1555.
5. Edwards, JP Anxiety and perceived psychological stress play an important role in the immune response after exercise / JP Edwards, NP Walsh, PC Diment, R. Roberts // Exercise immunology review. - 2018. - Vol. 24. - R. 26-34.
6. Hackney AC The immune system and overtraining in athletes: clinical implications. // Acta clinic Croatica. - 2019. - Vol. 49.-P. 633-641.

7. Inkabi, SE Exercise immunology: involved components and varieties in different types of physical exercise / SE Inkabi, G. Pushpamitran, P. Richter, K. Attakora // Scientist journal of life sciences. - 2017. - Vol. 1, No. 1. - P. 31-35.
8. Joro R. Changes in cytokines, leptin, and IGF-1 levels in overtrained athletes during a prolonged recovery phase: A case-control study. // Journal of sports science. - 2017. - Vol. 35 , No. 23. - R. 2342-2349.
9. Kostrzewa-Nowak, D. Effect of aerobic and anaerobic exercise on the complement system of proteins in healthy young males / D. Kostrzewa-Nowak, J. Kubaszewska, A. Nowakowska, R. Nowak // Journal clinical medicine. - 2020. - No. 9(8). - R. _ 2357.
10. Simpson RJ Can exercise affect immune function to increase susceptibility to infection? // Exercise immunology review. - 2020. - Vol. 26. - R. 8-22.
11. Shaw DM T-cells and their cytokine production: the anti-inflammatory and immunosuppressive effects of strenuous exercise. // Cytokine. - 2018. - Vol. 104. - R. 136-142.
12. Valtonen, M. Common cold in Team Finland during 2018 Winter Olympic Games (Pyeong Chang): epidemiology, diagnosis including / M. Valtonen // British journal of sports medicine. - 2019. - Vol. 53. - P. 1093-1098.
13. Walsh, NP Recommendations to maintain immune health in athletes. // European journal of sport science. - 2018. - Vol. 18 , No. 6. - R. 820-831.