Global Journals LaTeX JournalKaleidoscope™
Artificial Intelligence formulated this projection for compatibility purposes from the original article published at Global Journals. However, this technology is currently in beta. *Therefore, kindly ignore odd layouts, missed formulae, text, tables, or figures.*

# Assessment of the Level of Adaptation and Disadaptation of Athletesbody to Physical Loads

Abdugafur A. Khadjimetov

*Received: 12 December 2017 Accepted: 4 January 2018 Published: 15 January 2018*

## Abstract

Data of blood indicators, oral fluid and lactate in rowers on canoes, canoes at rest and under the influence of complex of physical activities of different directions are given in this study. The study involved canoeists and canoes (21 athletes, men and women, aged 19-25 years), who are at the general preparatory stage of the preparatory training period. The dynamics of the content of histamine in the oral fluid and blood as well as the content of lactate in the blood were investigated. The results of the study indicate the degree of adaptation of the athlete to physical activity.

***Index terms***— sport, physical activity, adaptation, histamine, lactate.

## 1 I. Introduction

he main goal of top-level sports is to achieve the highest possible sports results in sports competitions, competitions of various levels, and, of course, at the Olympics. Any athlete's highest achievement is not only personal for him, but also becomes a national treasure, as records and victories in major international competitions contribute to maintaining and strengthening the country's authority in the international arena.

One of the most important problems of modern sports science and practice is the problem of adaptation to muscular activity. It is known that any adaptation is the output of a biosystem to a new level of homeostasis. In this case, the first rebuilt regulatory mechanisms. Only after this, physiological or morphological changes occur [1,2,3] . Constantly increasing amounts of training loads can cause a number of violations of the functional state of athletes, lead to overstrain of body systems, increase injuries, reduce the level of athletic performance, as well as reduce the duration of performances at the stage of conservation of sports achievements [4,5] . To prevent these phenomena, constant monitoring of the functional state of athletes is required using a number of methods that allow assessing readiness to perform significant loads, speed of regenerative processes, efficiency of functioning of various physiological systems, degree of mobilization and use of reserve capabilities of the body, orientation and efficiency of training effects of loads. Since the state of the adaptive capabilities of the body of the rowers in a canoe and canoe at the general preparatory stage of the preparatory period contributes to the formation of a Author ? ?: PhD at the Republican Scientific-Practical Centre of Sports Medicine, Tashkent, Uzbekistan. e-mail: author.uzb@mail.ru functional base that ensures the implementation of large volumes of special work. In turn, monitoring the capabilities of the body during stress loads allows you to evaluate the effectiveness of the training process at the subsequent stages of preparation, which makes this study relevant [6] . The commonly used laboratory methods (determination of lactate, glucose, urea, etc.) involve the determination of the final or intermediate products of a particular type of metabolism and do not give an idea of the regulatory processes in the body. Quite simple methods are needed that allow in a short time to give an objective conclusion about the degree of adaptation of the athlete's body to physical exertion.

The purpose of this study is to study the dynamics of free histamine and lactate in biological fluids at rest and after exercise in rowers in canoes and canoes at the general preparatory stage of the preparatory training period.

## 2 II. Material and Methods

The studies were carried out in the Republican Scientific and Practical Center for Sports Medicine with the participation of 24 paddlers in canoes and canoes (men and women, age 19-25 years old, sports qualifications

MS, MSIC) are in the general preparatory stage of the preparatory training period. The control group consisted of 16 functionally healthy students.

To determine histamine from athletes, they collected 1 ml of oral liquid in a centrifuge tube with 4 ml of 10% trichloroacetic acid. Then in the centrifugate was determined the level of histamine. Determination of histamine in various biological fluids (serum and oral fluid) was performed by gas-liquid chromatography with a Thermo Scientific TSQ 8000 EVO mass spectrometer GC-MS / MS.

In parallel, at rest and after exercise, the blood lactate content was determined using the ROSH biochemical analyzer COBAS-311 using reagents of the same company.

To assess the functional state of the cardiovascular system at rest and after exercise, the heart rate (HR) was determined -by palpation on the radial artery or by means of an electrocardiograph, blood pressure (DC) -by auscultatory method. Testing was performed on the Tredmile runway (Germany). Gas analysis of exhaled air was carried out with the MetaMax high-speed automatic gas analyzer. Pulse modes were recorded using a Sport Tester heart rate monitor. The obtained experimental data were processed on a computer using the generally accepted methods of mathematical statistics.

# 3 III. Results

The prevalence of allergic diseases among the population of the planet, which according to WHO data currently makes up about 40%, cannot but concern athletes of the highest achievements. As shown by our studies in athletes of higher achievements who suffered from recurrent symptoms of the nose (nasal congestion, rhinorrhea, etc.), an allergic reaction (AR) was identified. Thus, according to foreign data, it was found that more often the AR was detected in water sports (swimming, rowing, diving), in comparison with waterless sports. In such susceptible individuals, cold dry air leads to the release of mediators from the fat (histamine, tryptase) and epithelial cells, which may be secondary to the increased osmolarity of mucous secretions.

As can be seen from the results of the study, in the process of stress in athletes rowing on kayaks and canoes, an individual "histamine profile" is formed, characterized by an increased content of free histamine in the body. In this situation, the medical examination and electrocardiography did not detect any abnormalities in the health status of this group of athletes with consistently high concentrations of histamine in biological fluids. Obviously, a high level of free histamine in the blood in this case represents a long-term sustainable adaptation to regular physical exertion. This is also true in relation to the adaptive increase in the level of histamine in the athlete's oral fluid. It is possible that a high level in the body of athletes (formed as an adaptation to high physical exertion) in the future may lead to the development of an allergic disease.

In the majority of the sportsmen surveyed, the lactate content at rest mostly corresponded to the normative one. Nevertheless, in four rowers, the lactate values at rest were significantly higher than the upper limit of the norm and amounted to 2.72 -3.45 mmol/l, which indicates the activation of the glycolcompensatory reaction in the conditions of oxygen deficiency of the body. It is known that the reaction of the body of athletes to the standard load is one of the indicators of the state of their fitness. In this regard, of undoubted interest was the analysis of the reaction of the body of rowers to the standard work on the content of lactate in the blood. Standard exercise, limited by duration and intensity, caused a different reaction of the body to lactate levels in the blood. The most optimal metabolic reaction is the minimum increase in blood lactate in response to the standard load. Such a reaction was noted in most athletes, but in individual subjects the lactate content increased significantly (even relative to other athletes, providing a lower metabolic response of the body to standard work. After performing the load in steps of increasing power, practically all athletes had the maximum metabolic reaction immediately after it was performed. The lactate content was in the range of 8.6-12.7 mmol / l. The high utilization of lactate observed in the overwhelming majority of rowers indicates their high fitness.

# 4 IV. Discussion

Numerous studies have shown that intensive training work in athletes leads to a decrease in the level of free histamine in the body. During the rest period, its content returns to its original level, passing through the stage of super restoration. With sufficiently intense loads, an increase in its level compared to the baseline is observed approximately a day after work. Thus, with daily training sessions, it is possible that each subsequent workout occurs during the super-recovery phase in the histamine system after the previous one. As a result of the cumulative training effect, its content in the body in this case increases. As training improves, the recovery of histamine used in the process starts to occur at a faster rate. In this case, the over-recovery phase ends earlier than the next workout begins. Thus, the impact of regular training loads leads to a steady increase in the level of free histamine in the body of athletes at rest. The accumulation of substances with such a high biological activity, cannot affect the various aspects of the life of the athlete. On the one hand, a high level of histamine in biological fluids is associated with a number of pathological conditions, such as infectious-inflammatory processes, allergies; on the other hand, there is evidence of better athletic performance in athletes with higher levels of histamine. To clarify this issue, we conducted a study among athletes (rowing and canoeing) the effects of the initial level of histamine in the body on physical performance when working in different modes. As shown by the study, for each mode of operation there is its optimal level of histamine in the oral fluid and in the blood. Thus, the accumulation of free histamine in the body while reducing the oxygen capacity of the blood is aimed at

preventing the weakening of the oxidative function, which is possible due to the ability of histamine to increase coronary circulation, dilate blood vessels, increase local blood flow and, thus, improve the blood supply to the heart and other organs and tissues with oxygen. In addition, the revealed numerous relationships between the content of free histamine in biological fluids and the performance of the cardiovascular system (arterial and pulse pressure, heart rate, etc.) confirm that the control effect of histamine on the processes of adaptation to muscle activity is mediated by influence on blood circulation. During intensive muscular work, the body functions under conditions of partial anaerobiosis. Under the influence of regular training and competitive loads, a long-term adaptation of the athlete's body to the conditions of oxygen deficiency occurs. In particular, the body creates a "stock" of histamine, which allows to a certain extent to weaken the effect of hypoxia. Accumulating in the body, histamine inhibits acetyl cholinesterase, thereby increasing the concentration of acetylcholine and activating the parasympathetic division of the autonomic nervous system.

Under the influence of increased parasympathetic regulation and the direct action of histamine on the heart and blood vessels, the level of functioning of the circulatory system in a state of rest decreases. As you know, during physical exertion, the strength and heart rate, blood pressure increase, but this increase is limited by the capacity of the heart. Therefore, at low values of these indicators at rest, the range of their possible changes expands, i.e. low level of functioning of the circulatory system at rest creates a reserve for its activation during operation.

The analysis of the staged state of such indicators as histamine and lactate in the blood made it possible to assess the state of fitness of athletes of the studied group, both at rest and after exposure to a complex of loads of different energy orientation. Similar dynamics were observed with respect to histamine in the oral fluid. The results indicate that an individual correction of the athlete's condition is carried out, to give nutritional and pharmacological recommendations with a view to optimizing it, which can contribute to the enhanced solution of specific tasks facing athletes in the general preparatory stage of the preparatory training period.

# 5 V. Conclusion

1. The reaction to the standard load on the content of histamine in the oral fluid and blood as well as the content of lactate in the blood made it possible to draw a preliminary conclusion about the degree of fitness of the examined contingent of athletes. 2. Rowers had a prolonged production of histamine and lactate release into the blood for 10 seconds of recovery, which causes its delayed utilization. 3. A positive correlation is noted between the value of the heart rate and the content of histamine and lactate in the blood for 10 s recovery after performing the load in steps of increasing power. 4. Monitoring indicators of histamine and lactate in the blood of athletes at the general preparatory stage of the preparatory training period made it possible to evaluate and outline ways for its correction. Further study of the dynamics of lactate and histamine in the oral fluid and blood during different periods of preparation will improve the effectiveness of training loads and predict athletic performance by optimizing the metabolism of athletes.

**1**

| | Control Group | Resting State | After Standard Load | After Loading Stepwise Increasing Power, 10 S; |
|---|---|---|---|---|
| Histamine in Oral Fluid (?M / L) | 7,83 ± 0,82 | 8,01+ 0,56 | 9,21+ 0,78 | 15,84+1,32* |
| Histamine in Serum (µM / L) | 12,34+ 0,87 | 11,67+0,97 | 12,33+1,05 | 19,51+ 2,03* |
| Blood Lactatemmol / l | 1,56+0,11 | 2,03+ 0,19 | 2,56+ 0,18* | 10,76+ 1,09* |

Note: * -significance of differences P <0.05;
When resting -HR-72 beats/min.
After a standard HR load of 130 BP/min.
After a load of stepwise increasing power, 10 sec.-HR-180 BP/min.

Figure 1: Table 1 :

# .1 Acknowledgments

We thank the stuff of Republican Scientific-Practical Centre of Sports Medicine for their hard work and dedication, and the sportsmen in this trial, their trainers, and the many individuals not specifically mentioned in the paper who have supported this study; and Bekhzod Abdullaev for his assistance with preparation of this paper. The trial was initially supported by authors' themselves and additional support was received from scientific department of our Centre.


# .2 Consent Ethical Approval

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

# .3 Declaration of Interests

Authors declare that there is no competing interests.


[Bekus et al.] R D H Bekus , E U Banister , K Bouchard , S Dulac , G J Greene , H L Habli-Cody , D D Mc-Dougall , Kiev . *Olympic literature*, p. .

[Bondarchuk] *Management of the training process of high-class athletes// A. P. Bondarchuk*, A P Bondarchuk . Olympia Press. p. .

[Mishchenko et al.] 'Reactive properties of the cardiorespiratory system as a reflection of adaptation to intense physical training in sports'. V S S Mishchenko , E N Mishchenko , V E Lysenko , Vinogradov . *Scientific World*, (Moscow) p. .

[Katz and Sahlin ()] *Role of oxygen in human skeletal muscle. Exercise and Sport Science Reviews*, A Katz , K Sahlin . 1990. 18 p. .

[Platonov (ed.)] *The system of training athletes in the Olympic sport*, V N Platonov . N. Platonov. -K.: Olympus. lra (ed.) p. .

[Zemtsova (ed.)] *Workshop on sports / I*, I I Zemtsova . I. Zemtsova, S. A. Oliynik -K .: Olimp. L. (ed.) p. .