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The Effect Of Anaerobic Physical Exertion According To The Variance Of The Gene (MCT1) On The Level Of Lactic Acid Concentration In The Blood And The Achievement Of 200 M Free Swimming

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Abstract
The study aimed to identify the heterogeneity of the MCT1 gene in the 200m freestyle swimmer and its effect on the level of lactic acid concentration in the blood and the completion of the 200m freestyle swim. Free according to the heterogeneity of the MCT1 gene. The sample of the research was chosen by the intentional method with the middle Euphrates swimmers participating in the Iraqi men's swimming championship for the 2017-2018 sports season, free-swimming, as they numbered 12 swimmers. Measuring the MCT1 gene at rest) (measuring the concentration of lactic acid in the blood during rest and after 5 minutes of effort) (achievement of the 200-meter free-swimming race). The researcher concluded that the difference in the heterogeneity of the MCT1 gene for the research sample of swimmers was within two levels, high and low, and that the level of lactic acid concentration in the blood after anaerobic physical exertion for the 200m freestyle race was less high for the group with the high level of the MCT1 gene compared to the low group, and this confirms that individuals who have The heterogeneity of the MCT1 gene is high, their ability to endurance and resistance to fatigue is greater, and the completion time for the 200-meter freestyle race was less time for individuals with a high level of the MCT1 gene compared to individuals with a low level, and this confirms that individuals who have a high rate of variation of the MCT1 gene have a level of physical efficiency high and achieve better
Keywords*: mct1 gene lactic acid*

Introduction and importance of research

Genes are responsible for about half of the potential in physical performance between individuals, and genes are also responsible for half of the potential when responding to physical training, and they are more important than the training itself in explaining the differences in performance between athletes. Through genes, the type of sport that suits

the individual is renewed and through Genetics The genetic factor of physical fitness and physical performance is improved, as well as the optimal beneficiary of training is known. Some genes responsible for the change in the level of physical performance of athletes were revealed, including the genes associated with physical effort, fatigue and lactate, which is the MCT1 gene.

The MCT1 gene is considered one of the modern scientific discoveries in the sports field because it is considered as a theory that contributes to the knowledge and interpretation of indicators of the occurrence of fatigue that it causes through the main role that it plays, which is the transfer of lactic acid from inside to outside the cells as it is responsible for the rapid absorption of lactate in the blood and muscles and the process of lactic oxidation. To use it as an energy fuel.

The 200-meter swimming event is one of the individual games that need individuals with special qualities that qualify them to practice the type of race according to the distinctive genetic classification, and through it, swimmers can be selected according to the type of race that is related to physical effort and their physical ability, which requires a high ability to withstand the rate of rise in concentration Lactic acid is a result of anaerobic physical exertion, as it is associated with many physiological changes that give an indication of the adequacy of the swimmer during the races.

From the above, we find that genes play an important role, especially the MCT1 gene, the monocarboxylate transporter, which is responsible for the rapid absorption of lactate into the blood and muscles and the process of lactic oxidation to benefit from it as fuel for energy, which leads to improving the level of performance. The level of lactic acid concentration in the blood and the achievement of 200 m free swimming according to the heterogeneity of the MCT1 gene.

This prompted the researcher to do this study to be able to try to shed light on the role of genetics, especially the MCT1 gene, and its relationship to the level of lactic acid concentration and the level of achievement to benefit from it as fuel for energy during the training and competition process.

Purpose of research

Identifying the heterogeneity in the MCT1 gene in the 200 m freestyle swimmer, as well as the effect of anaerobic effort according to the variance rate on the level of lactic acid concentration in the blood and the completion of the 200 m freestyle swim.

Method and procedures

Research Methodology

The problem, its nature, and the objectives of the research are what determine the type of method used

The researcher is the descriptive approach because it is the appropriate approach to solving the research problem and achieving goals

The research sample

The sample of the research was chosen intentionally in the middle Euphrates swimmers participating in the Iraqi men's swimming championship for the sports season 2017-2018 for the 200m freestyle race, as their number was (16) swimmers, and after the homogeneity procedure, (4) swimmers were excluded for their heterogeneity, and the number of sample members became (12) Swimmers, as they represent (9) clubs from the middle Euphrates clubs. Table 1 illustrates this.

Table (1) shows the homogeneity of the sample with morphological variables

No	Variables	measuring unit	Arithmetic mean	standard deviation	coefficient of difference
1	height	cm	175.112	3.834	2.189
2	the weight	kg	72.330	1.599	2.213
3	Age	year	26,934	1.411	5.238
4	training age	year	10.355	1.198	11.569

After that, the sample members were classified according to the percentage of variation in the MCT1 gene into two groups as follows:

The first group: (6) swimmers with a heterogeneous rate in the elevated MCT1 gene.

The second group: (6) swimmers with a heterogeneity in the low MCT1 gene.

Study variables

The variables that closely fit with the study and the related statistical treatments were identified and studied to solve the research problem and were as follows:

First: the MCT1 gene.

Second: the concentration of lactic acid in the blood.

Third: Completing the 200m freestyle race.

Measuring the MCT1 gene at rest

A sample of the swimmer's blood was drawn at a rate of 5cc before the effort at exactly nine o'clock in the morning, as the swimmers were in a state of complete rest and without any physical effort to know the genetic diversity of MCT1. Injections into the numbered blood preservation tubes according to the sequence of the names of the swimmers in a registration form for measurement, as the number on the tube represents the name of the swimmer, provided that each tube is flipped 3-5 times by hand so that the blood sample mixes with the anticoagulant inside the tubes and then kept in the cool box (COOL BOX) and moved to be kept in a cool place to the genetic laboratory at the College of Veterinary Medicine at the University of Qadisiyah, and the same process is repeated with the rest of the swimmers.

After conducting laboratory analyzes by analyzing and revealing the MCT1 gene during its various stages by a specialist, and after extracting the results for the MCT1 gene, the sample members were classified into two groups according to the different proportions of

the MCT1 gene, each group (6) swimmers (the first group has a high percentage of the gene, while the second group has the percentage of the gene low).

Measurement of the concentration of lactic acid in the blood:

A blood sample was taken for each swimmer before the anaerobic effort (rest time and after 5 minutes of effort) to measure the concentration of lactic acid in the blood using the LACTIC PRO METER device. For the first time, it is taken the second time to avoid the appearance of lactic salts, and thus affects the results of lactic acid, and it is placed on a STRIP TEST, as it only requires about 5 microliters of blood, and the result can be known in less than a minute and then recorded in the swimmer's data every time the measurement is made.

The main experience:

Before the effort

Pre-effort measurements were made on the 12 swimmers in the Italian pool in Diwaniyah on Tuesday 16/2/2018 to measure the MCT1 gene and measure the concentration of lactic acid in the blood. Samples were taken from a sitting position.

Anaerobic exercise

The researcher conducted an anaerobic physical effort, which is a 200m freestyle race for the research sample (12) swimmers by conducting a 200m freestyle race in the Italian swimming pool in Diwaniyah on the same day. Swimmer with a special record after the end of the race.

After the effort

The researcher drew blood samples after the anaerobic physical effort of the 200m freestyle race for the research sample (12) swimmers after the end of the 200m freestyle race on the same day, as the swimmer gets out of the pool and sits on a chair next to the pool and after (5) minutes a sample is drawn In order to extract the values of the concentration of lactic acid in the blood, "5 minutes is the best period for the transfer of lactic acid from the muscles to the blood" (Al-Qatt Muhammad 1999, p. 27).

Statistical means:

The researcher used the SPSS statistical package to find the results

Presentation, analysis and discussion of the results:

Presentation of the results of the level of lactic acid concentration in the blood and the level of achievement of the 200m freestyle race for the two groups with the high and low level of the MCT1 gene for anaerobic physical effort for the previous 200m freestyle swim, analysis and discussion.Presentation, analysis and discussion of the results of the level of lactic acid concentration in the blood for the two groups with a high and low level of the MCT1 gene before and after the anaerobic physical effort of the 200m freestyle race.

Table (2) shows the mean, standard deviations, and the calculated T value for the level of lactic acid concentration in the blood for the two groups with high and low levels of the MCT1 gene before the effort and after the 200m freestyle race.

No	Variables	measuring unit	the group	before the effort		after the effort		Calculated T value	Indication level
				Q	A	Q	A		
1	Lactic acid concentration in the blood	mmol/liter	Elevated level of the gene mct1.	1.118	0.123	11.826	1.761	22.541	*0.000
			Low level of the gene mct1.	1.091	0,082	12.275	2.466	37.161	*0.000

- Moral

Through our observation of the above table, it appeared that there were significant differences in the measurement of the concentration of lactic acid in the blood before and after the anaerobic physical effort of the 200-meter free-swimming race for the group with a high level of the MCT1 gene. 0.000), which is a significant value, while there were also significant differences in the measurement of the concentration of lactic acid in the blood before and after the anaerobic physical effort of the 200m freestyle race for the low-level group and in favor of the effort dimension, through the appearance of the calculated (t) value of (37,161) below the level of The significance of (0.000) is a significant value. The researcher attributes the reason for the emergence of these differences and in favor of the anaerobic physical effort of the 200m freestyle race to the anaerobic work done by the swimmer during the race that produces anaerobic energy, as the increase in the level of lactic acid concentration in the blood in the members of the group with The high level of Gene 1 MCT for the effort of the 200m freestyle was very high, because the swimmer in this group is characterized by high effort compared to the low level group and makes this a very high burden on the swimmer Especially the performance is with maximum effort and more repetition during the race period, as working at high intensity is able to increase the lactic acid in the blood due to the anaerobic glycolysis process that the body performs to return the ATP compound inside the muscle cell with insufficient oxygen to the working muscles, which leads to lack of The ability of mitochondria to introduce the released hydrogen ion into the respiratory chain, thus uniting the pyruvic acid with the hydrogen ion to form lactic acid. Thus, the pyruvic will unite with the liberated hydrogen ions to form lactic acid (Al-KhafajiWafaa and Al-Safi Asaad, 2018, p. 8). But this increase in concentration when compared with the members of the group with a low level of the gene is less as a result of the high level of the MCT1 gene in their Ahmed, 2010, pg. 171).

Presentation, analysis and discussion of the results of the level of lactic acid concentration in the blood between the two groups with high and low level of MCT1 gene after anaerobic physical effort for the 200m freestyle race.

Table (3) shows the mean, standard deviations and calculated (T) value of the concentration of lactic acid in the blood between the two groups with high and low level of MCT1 gene after anaerobic physical effort for the 200 freestyle races

No	Variables	measuring unit	Elevated level of the gene mct1.		Low level of the gene mct1.		Calculated T value	Indication level
			Q	A	Q	A		
1	Lactic acid concentration in the blood	mmol/liter	11.826	1.761	12.275	2.466	6.877	*0.001

•moral

Through our observation of the above table, it appeared that there were significant differences between the two groups with a high and low level of the MCT1 gene after the anaerobic physical effort of the 200m freestyle race and in favor of the group with a high level of the MCT1 gene, through the appearance of the calculated (T) value of (6.877) and below the level of significance (0.000).

It is a significant value, and the researcher attributes that the members of the group with a high level of the MCT1 gene have higher functional capabilities than their peers in the group with a low level of the MCT1 gene. Thus, this increase in abilities led to an improvement in the work of the functional organs. We note a decrease in the level of the concentration of lactic acid in the blood of the group Those with a high level of the MCT1 gene compared to the group with a low level of the MCT1 gene "as the concentration of lactic acid in their blood is less concentrated compared to individuals with a low level of the gene in the event that they perform the same training load or anaerobic effort and this is due to the increase in the efficiency of the work of vital organizations to get rid of Increasing lactic acid" (Abu El-Ala Abdel-Fattah, 2003, p. 76).

From the foregoing, the group with a high level of the MCT1 gene was the best as a result that the rise in the level of the gene was less compared to the group with a low level and thus its great ability to withstand fatigue and the ability to get rid of lactic acid as a result of their gene increase, especially after the anaerobic physical effort 200m free swimming "The protein of the MCT1 gene works to reduce lactate after high-intensity anaerobic stress, as the increase in the gene expression of the MCT1 gene is followed by an increase in the rate of lactate exchange. Also, the percentage of lactate that is mobile and transported to and from working muscles depends on the density of the concentration of the MCT1 gene in those muscles, meaning the higher the intensity of the MCT1 gene in those muscles. Its concentration reduces the accumulation of lactic acid, and thus the high ability to get rid of acid, increase endurance and achieve the best achievement" (Scottk, 2000, p 214).

The elimination and oxidation of lactate is related to the extent of the effect of physical training on the MCT1 gene. Research has proven a relationship between physical training and the genetic diversity of MCT1 and that the MCT1 gene has a major role in the rapid elimination of lactate, as well as an important role in the case of chronic electrical stimulation, that is, the long-term elimination of lactate. Lactate in high intensity

exercises. Research also confirmed that the MCT1 gene is highly sensitive to endurance training, as its intensity increases by 78% after the end of training directed to develop the component of endurance, as endurance training increases the genetic diversity of MCT1 in muscles due to its presence in the muscle membrane and the mitochondrial membrane (Hussein Heshmat and Abdel Kafi Ahmed, 2010, p. 172).

Presentation of the results of the level of achievement for the 200m freestyle race between the two groups with high and low levels of the MCT1 gene after anaerobic physical exertion, analysis and discussion

Table (4) shows the arithmetic means, standard deviations, and the calculated (T) value for the achievement level of the 200m freestyle race between the two groups with high and low levels of the MCT1 gene after anaerobic physical exertion.

No	Variables	measuring unit	Elevated level of the gene mct1.		Low level of the gene mct1.		Calculated T value	Indication level
			Q	A	Q	A		
1	Completing the 200m freestyle race	min	2.050	0.201	2.339	0.225	5.106	*0.001

Through our observation of the above table, it appeared that there were significant differences between the two groups with a high and low level of the MCT1 gene after the anaerobic physical effort of the 200m freestyle race and in favor of the group with a high level of the MCT1 gene, through the appearance of the calculated (T) value of (5.106) and below the level of significance (0.001).

It is a moral value. The researcher attributes the moral results to the level of achievement because the group with a high level of the MCT1 gene is distinguished by a high ability of lactic endurance that is commensurate with the type of race and the energy system more when the level of lactic acid concentration rises, and thus gives additional capabilities to the swimmer, which helps him in the ability to endurance and increase the disposal of height Which occurs in the level of lactic acid concentration, “as the MCT1 gene can play an important and additional role, which is the expulsion or introduction of lactate depending on the required balance between metabolism and oxidation processes, and therefore the weak ability of individuals who have a low MCT1 gene to tolerate lactate leads to less efficiency in lactic loss than Inside the muscles and thus lead to the process of lactate accumulation inside the muscles greatly (Hussein Heshmat and Abdel Kafi Ahmed, 2010, p. 171).

Brooks confirmed this through violent practice. As the rapid increase in energy demand by the muscles is associated with the production and accumulation of lactate, protein and ions, lactate and protein are subsequently removed by various intracellular mechanisms

and released into the blood and other cells are removed according to the lactate shuttle (Brooks, 2002, p333). The gene (mct1) is to facilitate the shuttle movement of lactic acid into or out of cells depending on this metabolic mechanism in cells, (mct1) can be used to transport lactate to cells for gluconeogenesis which is the main substrate, especially after exercise (Halestra and Meredith, 2004, p619).

Since the sample members are swimmers, and their training age is 10 years, if they have the ability to maintain low levels of lactic acid, and this was confirmed by the results, “a. Chemical and biological training" (Al-RawiHaitham, 1996, p. 17). "The concentration of lactic acid in the blood is one of the main indicators that work on the individual's ability to continue performing, and this means that the individual in whom the ratio appears in a lesser way has a greater ability to continue performing than others who appear in him with a high concentration of this acid." (Mohammed Ashman, 1990, p. 230). This was confirmed by the results of this study in the level of completion of the 200m freestyle race.

Since the individuals who have a high level of the MCT1 gene have a high level of performance through a lower performance time for the 200m freestyle race compared to the individuals with a low level of the gene, then the muscles of the swimmers with a high level of the MCT1 gene are characterized by a high percentage of the MCT1 gene and thus increase their endurance The onset of fatigue is delayed and therefore works with a low concentration of lactic acid as a result of the processes of getting rid of it in the muscles of individuals, and this means the concentration of the MCT1 gene is proportional to the concentration of lactic acid, which is formed as a result of physiological processes in the body (Al-Zahir Abdel Rahman, 2001, p. 289).

Here, the role of genes, especially the MCT1 gene, the monooxylate transporter, which is responsible for the rapid transport of lactate in the blood and muscles, and the process of lactic oxidation, to benefit from it as fuel for energy, which leads to an improvement in the level of performance.

Conclusions and Recommendations

Conclusions

1- There is a difference in the percentage of heterogeneity of the MCT1 gene for the members of the research sample within the high and low levels.
2- The level of lactic acid concentration in the blood after the anaerobic physical effort of the 200m freestyle race was less high for the group with the high level of the MCT1 gene compared to the low group.
3- The completion time for the 200m freestyle race was less for the group with the high level of the MCT1 gene compared to the low group, and this confirms that the individuals who have a high percentage of the MCT1 gene have a high level of physical competence and achieve a better achievement.

Recommendations

1- The necessity of conducting MCT1 genetic analysis for swimmers to help them select swimmers, especially juniors.
2- The necessity of benefiting from the results of the study in building training curricula for swimmers, especially the 200m freestyle race.
3- The necessity of paying attention to the high and low percentage of heterogeneity of the MCT1 gene due to its important role in recognizing the phenomenon of muscle fatigue.
4- The need to pay attention to the nature of the level of lactic acid concentration in the blood during rest and after anaerobic physical exertion for swimmers and the extent of its close relationship to the high and low heterogeneity of the MCT1 gene for the purpose of building appropriate training curricula for that.
5- Conducting other studies that help predict the achievement in terms of the level of variation of the MCT1 gene for some other chemical indicators in the blood for the types of races (50m, 100m, 400m) freestyle.
6- Work to provide laboratories and equipment that help to conduct genetic analysis in the sports field.

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