The effect of aerobic exercise on resting heart rate in terms of gene (MCT1) for junior futsal players

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ABSTRACT

The study aimed to prepare aerobic exercises and to know its effect on the heart rate at rest with regards to MCT1 gene. As for the hypotheses of the study, there is a difference in the alleles of the MCT1 gene in the study sample for aerobic exercise and there is an effect on the response of the young futsal players to the juniors in terms of the alleles of the MCT1 gene. The researchers adopted the experimental approach and identified the study population, who are the 18 players of Al Hilla Sports Club for Futsal Football for the 2019-2020 season. Two groups according to the alleles of the gene (MCT1), (AA) group consisting of (8) players and an AT group consisting of (7) players, divided according to allelic heterogeneity, and their lengths ranged (166.8 cm), weights (62.2 kg), and ages (15.5) Years), and exercise was standardized for both groups. The conclusions of the study were that aerobic exercises prepared by the researchers had a clear positive effect in developing the heart rate variable for the two heterozygous groups (AA) and (AT), and that the group of individuals who carried allele (AA) had a better response to aerobic exercise in the heart rate variables. From individuals carrying the allele (AT).

Key words: aerobic exercise, (MCT1), heart rate, futsal

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INTRODUCTION

The futsal game has a great place in all parts of the world because of its ease of play and its enjoyment and its physical impact because it is characterized by inclusion in movement and skill. Physiological training in the field of training is one of the main topics in the field of physical education, and through it the training loads are codified according to the physiological capabilities of the players. Genetic traits have a great role in determining the physical and physical characteristics, as scientists were able in recent times and after many studies took it upon themselves to try to decode the composition of the human gene A number of genes have been identified that are related to athletic performance and this helped to know the extent of the effect of these genes on the level of performance and then achievement due to their deep role in selection. Genes are responsible for a large part of the variables in physical and skill performance and response to training [1] And players differ among themselves as to what these genetic changes carry for each one of them according to the mechanisms, and from the genes (MCT1) gene and these genes Responsible for athletic performance and cardiac capacity from the number of heartbeats and the size of the heart, which affects the amount of accumulation of lactic acid in the blood and delay in reaching the lactic threshold [2]. Endurance and speed of performance [3], thus the importance of the study lies in the adoption of genetics in the training process as an indicator of the players' response to complex sports exercises.

The problem of the study is that the lack of distribution of players according to genetics and the preparation of aerobic training curricula as a basis for this enables the establishment of a solid base for teams foot halls comparable to the world players in general and Iraqi club players in particular, and aerobic exercises in terms of the alleles gene (MCT1) means to develop this important segment of the segments of the sports institution In the country. The study aimed to prepare aerobic exercises and to identify its effect on the resting heart rate in terms of the MCT1 gene for junior futsal players. The study hypothesis is that there is a difference in the alleles of the MCT1 gene in the study sample, and aerobic exercise has an effect on the response of junior soccer players in terms of the alleles of the MCT1 gene. Cells and tissues, which are mainly concentrated in muscles, as well as
the mitochondria gene that facilitates the transfer of lactate from working muscles, as it helps in the transfer of this lactate from one cell to another [4].

**METHODS**

**Design:**
The researchers used the experimental approach in the two equivalent groups of allelic gene (MCT1).

**Study population:**
The researchers identified the study population, who are the 18 players of Al Hilla Sports Club for Futsal Football for the 2019-2020 season. The selection was made using a comprehensive counting method after excluding goalkeepers. MCT1 group (AA) consisting of (8) players and a group (AT) consisting of (7) players were divided according to allelic heterogeneity of the gene, and their lengths ranged (166.8 cm), weights (62.2 kg), and ages (15.5 years), and the exercises were Standardized for both groups.

**Pre-test:**
After blood samples were drawn from the players to extract DNA, tests were carried out to ensure the quality and calculation of the extracted DNA and genotyping of the players. DNA purity, PCR, electrophoresis, and SSCP technology reveal the presence or absence of a difference in the sample genes, and after sending samples from the SSCP technology results to Micro gene in South Korea to read the nucleotide sequence of the transmitted genes. It is useful for genes and their areas of control. Therefore, a complete description that includes sequence analysis is now considered an important and necessary matter. "[5] Then, comparing it with the global gene model, by entering the NCBI website, shows a match with the technique (SSCP), that is, the presence of heterozygous alleles in a gene. (MCT1) The type of variation in the alleles of this gene has been determined. The SSCP technique indicates the presence or absence of a difference in the sample genes and does not indicate the type of variation until after the sample is sent to specialized companies to read the sequence of nitrogenous bases. Divide the study samples according to (genotyping), allelic heterogeneity ((MCT1)), allele group (AA), number of players (7). Group (AT) number of players (8).

An image of a SSCP gene showing the variation in the (MCT1) gene for samples

![Image of SSCP gene showing variation in the MCT1 gene](image)

A sample sequence of a gene is shown after sending an SSCP to a company

Ref. AGATGGCTGGGAAAGCCAAATGAGTTACAAAGCAGCAGAATCTTCGGGACCAGAAAG

ACACAGATGGAGGGCCCAGGAAGGAGAAAGTTCAGTCTGA

S1 ………………………………………………………A…………………

S2 ………………………………………………………A…………………

S3 ………………………………………………………A…………………

Heart rate test: Futsal (R.H) resting heart rate test:
The objective of the test: to measure the heart rate per minute [5].

Test tools:
1- An electronic pulse oximeter is placed on the index finger and then the result can be read.
2- A chair in which the player sits in a comfortable position.

3- Data registration form.
Test description:
The player sits comfortably on the chair and puts his hand on the back of the chair, then put the device on the index finger and after a minute the result can be read.

**Aerobic exercise:**
After conducting the pre-tests, the sample applied the aerobic exercise curriculum for a period of 10 weeks, and every week 3 training units, as the researchers took into account all the organizational and necessary procedures through which it was possible to advance the level for the junior category, and the exercises were in the general preparation period and are complex exercises that combine the skill and physical aspect. Training contains a set of goals that serve the study variable. The researchers used the continuous training method and the low intensity interval training method, and the researchers took into account the fluctuation of training intensity, size and density, taking into account the appropriate training configuration according to the objectives of the study:
1- The intensity of the exercises ranged between(65% to 85%), as the intensity measurement was based on time at times and the heartbeat at another time.
2- The repetitions of the exercises ranged from (1-11) repetitions and according to the intensity used.
3- The number of groups ranged between(3-5) according to the intensity and volume of the exercise.
4- The rest between exercises was the heartbeat reaching 120-130.
5- Rest ranged between groups, between (2-3) minutes.
6- The time of aerobic exercises was in the main section of the training unit, as the time of exercises reached (45-65 minutes). As for the plans and the final section, the researchers did not intervene except in some general recommendations that serve the study.

After the expiration of the period, the researchers conducted a post-test of measuring the heart rate at rest. Through the test results, the researchers were able to identify the response of groups that were divided according to the alleles of the gene (MCT1) group (AA) and (AT) as well as the response of the ACE group.

**Post-test:**
After completing the aerobic exercise, the researchers conducted the post-test in a manner and conditions similar to the pre-test.

**Statistical methods:**
The researchers used the following statistical methods (median, deviation, percentage, Mann-Whitney value, Wilcoxon value)

Table (1) shows the median value, deviation, and the Wilcoxon value for the (MCT1) gene for the AA allele group to measure heart rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measuring unit</th>
<th>AA</th>
<th>AT</th>
<th>Calculated Wilcoxon value</th>
<th>Tabular value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>against</td>
<td>Median 70</td>
<td>Median 66</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deviation 1</td>
<td>Deviation 0</td>
<td>Wilcoxon value</td>
<td>Tabular value</td>
</tr>
</tbody>
</table>

Table (2) shows the median value, deviation, and the Wilcoxon value for the (MCT1) AT allele gene to measure heart rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measuring unit</th>
<th>AA</th>
<th>AT</th>
<th>Calculated Wilcoxon value</th>
<th>Tabular value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>against</td>
<td>Median 69</td>
<td>Median 68</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deviation 3</td>
<td>Deviation 2</td>
<td>Wilcoxon value</td>
<td>Tabular value</td>
</tr>
</tbody>
</table>

Table (3) shows the median value, deviation, and the Mann-Whitney value calculated for the post-test for the two allele groups (AA) and AT) for the (MCT1) gene to measure heart rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measuring unit</th>
<th>AA</th>
<th>AT</th>
<th>Mann-Whitney calculated value</th>
<th>Tabular value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>against</td>
<td>Median 66</td>
<td>Median 68</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deviation 0</td>
<td>Deviation 2</td>
<td>Wilcoxon value</td>
<td>Tabular value</td>
</tr>
</tbody>
</table>

**DISCUSSION**
Discuss the pretest and posttest results for both the allele (AA and AT) groups of the (MCT1) gene:
The amount of blood pumped by the heart per minute during rest is equal between athletes and non-athletes, and the difference is in the economy of the heart in terms of the number of strokes per minute due to the size of the heart cavities, where the athlete has wider cavities and thus the size of the stroke increases the amount of blood paid in one stroke and is less effort, That the sports heart is the one who has the advantage of economical work, the
small number of strokes, the large size of the heart cavity and the appropriate amount of blood paid [6] from here it appears that the development in the number of heart beats for the two groups is due to the large size of the heart cavity as a result of aerobic exercises and the method of training that the researchers prepared My knowledge is coordinated taking into account the number of repetitions, the intensity of the training units and the appropriate length of hospitalization, as regular exercise increases the size of the heart and thus increases its strength, thus increasing the amount of blood paid to all members of the body [7]. Discussion of the dimensional tests of allele groups (AA and AT) for the (MCT1) gene to measure heart rate: By observing the table, it is evident that there are significant differences in the dimensional tests of the two groups of alleles (AA) and (AT) of the (MCT1) gene in favor of the allele group (AA). The gene expression of the heterozygous (AA) for the (MCT1) gene, where the researchers see that the gene's mechanism of action differs from one person to another according to the heterogeneity present in certain regions within the gene (the difference of alleles). Similar in the type of difference in the form of the sequence of nitrogenous bases, where the two groups are stratified aerobic exercises. The researchers took into account the sequence of prioritization between the rate of exercise difficulty and the correlation of any exercise with the type of energy that suits it and how the energy systems related to the body’s organs and systems were developed and that showed the significant differences in favor of the allele group (AA). In the most important recent scientific discoveries is that humans are similar in the human gene by (99.9%) and that all the differences between humans are due to (0.01) only (6), the researchers explain that this difference came as a result of the gene expression work in these The group is more than the other group i.e. the allele group (AT). From this it appears that the circulatory system has an effect in terms of exercises that lead to the development of the circulatory system more, that is, it increases the size and efficiency of the heart, which the researchers inferred through the economy of the heart's work at rest time and is an indication of the enlargement of the heart and the increase in the cardiac output in one stroke and thus increase The work of the arteries that carry oxygen and the veins that carry the remnants of metabolism and energy production (the changes in the heart rate at rest is a decrease in the number of beats per minute) The effect of regular aerobic training is one of the real indicators of the viability of the cardiovascular system, a distinctive relationship to the athlete’s body and a clear indication of the adaptation of the heart system And blood circulation on physical exertion) [8]. Experts confirm that sports training is an effective way to develop all athletic body parts as a result of persistent and regular training [9].

CONCLUSIONS
After reviewing the results, the researchers reached the most important conclusions, which is that aerobic exercises prepared by the researchers have a clear positive effect in developing the heart rate variable for the two heterozygous groups (AA) and (AT). Heart rate variables are better than the allele-bearing (AT) sample.

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