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The Relationship of Irisin with Leptin and Testosterone Hormones in Students of the College of Physical Education and Sports Sciences / Tikrit University

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ABSTRACT

Sports it is the best way to activate the vital processes of different organs of the body hormones affect the vital activity of living organisms, so physiological changes occur across all body systems as a result of exercise. The study aims to find out the effect of anaerobic exercise on the concentrations of irisin hormone and some of the hormonal variables in male sports practitioners, and the correlation between the hormone and the studied variables, the correlation between hormones with each other, and the correlation between the body mass criterion and the studied variables to find out the extent of the body mass criterion related to the variables and the extent of the correlation of the hormone irisin with the variables and the extent of the linkage of hormones with each other during anaerobic exercise. The study included (20) samples of blood from senior male volleyball players of the college of physical education and sports sciences in Tikrit University. Their age ranged from 21 to 26 years old and the duration of November 2018 to January 2019. As 40 blood samples were collected, blood samples were collected on the same day and for once fifteen minutes before the start of the exercise, and again ten minutes after the end of the exercise that lasted for an hour and a half. The results of the study indicated the absence of moral differences in the level of concentration of both irisin, and testosterone hormones in the group of volleyball players after the performance of the exercise compared to before exercise and Also the study showed a decrease in the moral level of the concentration of leptin hormone in the group of volleyball players after the performance of the exercise compared to before the exercise.

The results showed there is a correlation relationship a negative correlation between the irisin and leptin hormone, Whereas the correlation was positive between the irisin and testosterone hormone , As for the leptin hormone the indicate there is a correlation relationship a negative between the leptin and testosterone hormone among volleyball players.

The results showed that there no correlation between Body Mass Index (BMI) and the Irisin, Leptin, Testosterone hormones in volleyball players with respect to BMI.

Introduction

Physiology is an important science in the field of sports training [1]. It is also interested in studying the physiological changes that effect the body vital system and organs under the influence of a single-time physical exertion as a direct response or as a

result of a repeated performance or a regular exercise for long periods [2]. During series of changes that occur to the body [3]. Physical activity has been shown to cause changes in the energy needed for metabolism inside the body in order to maintain the

increase in energy resulted from muscle contraction as a result of physical exertion [4]. During physical exertion, the secretion of hormones appears clearly under the influence of short, intense and the secretion of hormones increases gradually by increasing muscle work, as the secretion of the hormone is related to the period of exertion and exercise [5]. The main function physical exertion is to remove toxins that occurs by increases the amount of spent energy, and what is spent as the degree of metabolism of food increases significantly during physical activity [6]. Human body cells need energy to perform their various functions, and this power is produced by mitochondria which is an organelles occur in the cytoplasm of the cell, they are also known as "energy houses". The body's need for energy is varyingly depends on the duration, strength and level of performance [7]. Energy in the human body is the source of movement, the source of sports performance of various types, and the source of muscle contraction, which cannot occur without energy production [8]. skilled performance is one of the main pillars through which a good level can be achieved and the effectiveness of volleyball depends on the Anaerobic System in about 80-90% with a short exercise and moderate high exertion. hormones have an important role in the vital physiological processes inside the body, especially the necessary energy production systems for the body [9], for example irisin hormone, this hormone converts white fats into brown fats [10] Irisin hormone the which raises the metabolic rate and reduces the resistance of insulin and obesity and secretes the hormone from the skeletal muscles and controls the secretion peroxisome proliferator coactivator 1 alpha (PGC1 α) which is the main regulating factor of muscle metabolism during exercise. if the genetic coding of PGC1 α increases it would leads to increased secretion of the hormone irisin during exercise leading to increased resistance to metabolic diseases [11]. leptin hormone regulates body weight and appetite as it works to reduce the activity or production of the nerve peptide of neurons that increase appetite, it has been observed that the increase in leptin levels happens when fat mass increases. Therefore the level of hormone decrease in the blood is associated with low body fat mass and not exercises [12]. Testosterone hormone is a steroid hormone and one of the male's sex hormones that increase the size and mass of muscles in the body and its secretion normally increases during exercise due to increases muscle strength [13]. Obesity is one of the problems of health nowadays and it is the main cause of many diseases, which leads to negative changes in all functions of the body and organs. Regular exercise is the right solution to get rid of excessive weight to protect the individual from diseases and thus protect the body from obesity [14].

Method: The study was conducted on a group of male students of the College of Physical Education

and Sports Sciences male of Tikrit University and 20 volunteer students were selected of the senior students, aged (21-26) years old (practicing volleyball). The general information of the students were collected through a questionnaire. The information included: Name, age, height, weight, type of game, student undergoing a course of treatment, chronic diseases.

Blood sample collection and serum preparation:

The blood sample was drawn from each student within the study twice and on the same day, once before performing the physical effort and again after performing the physical effort, as 5ml of intravenous blood was withdrawn from the students before the start of the physical exertion using a medical syringe and blood samples were placed in a sterile gel tubes. The blood samples were then placed in centrifuge for 15 minutes and at a speed (3000) rpm to get the serum, the serum was pulled by micropipette and placed in Bando tubes and kept in temperature of (-20C) until hormonal tests were performed. 5 ml of venous blood was also withdrawn immediately after the physical exertion, which lasted for an hour and a half. The serum was also reserved until hormonal tests were performed.

Determination of Irisin Hormone Concentration

The concentration of irisin were estimated using the analysis kit by for the quantitative determination of human irisin concentrations in serum, plasma, tissue homogenates, and Catalog number CSB-EQ027943HU, and by (USA) the America company my Biosource (Young-Pearse *et al.*, 2007). Using ELISA technology, the irisin concentrations were obtained depending on the calibration curve attached to the kit [15].

Determination of Leptin Hormone Concentration

The concentration of Leptin was estimated using the analysis kit by for the quantitative determination of leptin in human serum by an enzyme immunoassay method, and product code 125-300, and by the German company Labor Diagnostika Nord (Osmekhia *et al.*, 2010). Using ELISA technology, Leptin concentrations levels were obtained depending on the calibration curve attached to the kit [16].

Determination of Testosterone Hormone Concentration

The concentration of testosterone was estimated using the analysis kit by for the quantitative determination of Total testosterone concentration in human serum or plasma by a micro plate enzyme immunoassay, and product code 3725-300, and by the German company Slamed (Bristow, 1998). Using ELISA technology, testosterone concentrations levels were obtained depending on the calibration curve attached to the kit [17].

Results and discussion

Sports is the best way to activate the vital processes performed by different organs of the body, as the exercise of the individual regularly and continuously affects the level of energy production in the body

leading to an increase in the level of performance of body system and organs such as lungs, stomach and muscles. It also regulates the work of heart and activates the circulation and respiratory system [18]. The results in table (1) indicated that there are no significant differences at the probability level ($P \leq 0.05$) in the concentration of irisin in the athletes' serum after performing physical exertion with the results before the performance of physical exertion, possibly due to the level of glucose in the blood and skeletal muscles that affect the factor (PGC-1 α) where the low level of glucose causes an increase of lactic acid, the increased lactic acid is produced due to glycolysis during the exercise. Multiple contractions lead to the contraction of blood vessels, which leads to increased production of lactic acid in the skeletal muscles, and the increased concentration of lactic acid causes muscle fatigue for the player, and the increase of lactic acid leads to a high pH in the muscle tissue and thus hinders the process of muscular constriction, so the high pH is the main cause of fatigue during high-energy exercise. The level of glucose in the blood and skeletal muscles decreases, causing a defect in the secretion of (PGC-1 α) which controls the hormonal secretion of irisin in the blood [19]. muscles that affect the factor (PGC-1 α) physical effort in the volleyball group. Studies have shown that the reason for the low concentration of Leptin in the blood serum after high-voltage exercise is due to the increased level of glucose in the blood and muscle, as the levels of fat in the body decreases as a result of increased energy consumption, leading to an increase of the amount of energy burned (exerted) during exercise, which helps in the burning of fat in the body where the process of energy generation depends on ATP and produces energy by burning carbohydrates and fats during physical activities, whereas the chances of burning fats by high breathing and sweating increase. Exercise activates the metabolic processes in the body by increasing muscle mass where muscle movement during exercise consumes a large amount of energy by releasing stored fats, resulting in reduced fat mass and weight loss and reduced Leptin hormone [20]. In another study showed that the reason for the low concentration of leptin hormone is due to the severity and the type of exercise where the decrease of Leptin hormone is partly related to the time of exercise. Short exercises with high intensity leads to a decreased leptin hormone while long exercises with low intensity leads to high levels leptin hormone. is partly related to the time of exercise. Short exercises with high intensity leads to a decreased leptin hormone while long exercises with low intensity leads to high levels leptin hormone. The hormone in the blood is also directly associated with the body fat mass, so the fattest the body the higher level of leptin and the less fat body has a lower level of leptin hormone. Therefore, leptin works on regulation energy and body weight [21]. The high

concentration of leptin in athletes' serum before physical exertion in the volleyball group can be attributed to a decrease in the level of energy that leads to a decrease in the concentration of glucose in the body, reduced metabolism, increased body fat mass and higher lipids. [22]. The results in table (1) also showed no significant differences at the probability level ($P \leq 0.05$) in the concentration of testosterone in the athletes' serum after the physical exertion in the volleyball group before The performance of physical exertion in the volleyball group may be due to low glucose and the failure to burn sufficient amounts of fat, which are sources of energy in the body during short anaerobic exercise leading to reduced energy in the skeletal muscles and reduced metabolism of the which causes a malfunction in the secretion of testosterone [23]. The results in table (2) indicated there is a correlation relationship a negative correlation as a result of the correlation factor ($r = -0.81$) between irisin and leptin in volleyball players as the decrease in the concentration of irisin has to do with increased leptin concentration and this decrease causes high lactic acid in the skeletal muscles and blood leading to a decrease in the level of glucose, which is the body's energy source leading to a lower level of metabolism. Low energy level and metabolic process in the body leading to the high concentration of lipids. As a result the concentration of irisin decreased and the concentration of leptin in the blood increased [24]. Adenosine Triphosphate increases irisin by increasing energy level (ATP) as a characteristic of brown fatty tissue known for its excessive loss of energy taken as a source of heat and raising the rate of dietary metabolism in order to prevent the occurrence of obesity, as it protects the fatty tissue from obesity and insulin resistance [25,26] as a response the hormone leptin affects hypothalamus to reduce eating and increase energy consumption [27]. There is a correlation relationship a result of the correlation factor ($r = 0.53$) between irisin and testosterone as the decrease in the concentration of irisin is related to the low concentration of testosterone due to the fact that the irisin hormone is reduced by a decrease in the level of glucose that affects (PGC1) factor, that secretes the irisin hormone and increased lactic acid, the decrease in metabolism leads to a decrease in testosterone, i.e. the lower the concentration of irisin, the lower testosterone decreases [28]. Testosterone increases muscle size and mass by increasing the rate of muscle protein synthesis [29]. As for the relationship of leptin with testosterone, the results showed there is a correlation relationship a negative correlation a result of the correlation factor ($r = -0.49$) between leptin and testosterone in volleyball players as the increase of leptin increases fat cells in the body, to the high concentration of lipids the level of energy consumption in the skeletal muscles decreases during exercise and the testosterone decline [30].

Obesity is an increase in the amount of fat in sebaceous tissue or abnormal accumulation of fat mass. Obesity has effects on the physiology of cells as sebaceous tissue plays an important role in metabolism, immunity and endocrine glands [31]. Regular exercise helps the body to get rid of excess weight, brisk walking consumes 250 calories per hour and exercise and physical activity have to do with some changes that increase fat degradation such as low leptin and increase the secretion of testosterone and other hormones, these hormones increase the level of fitness of the individuals, increase the level of fat degradation during the exercise sought as well as increase the ability of the heart muscle to adopt on the energy generated by lipolysis [32]. Table (2) shows the relationship between BMI and hormones in the group of volleyball players, As The results in table (2) indicated no correlation relationship a negative correlation as a result of the correlation factor ($r = -0.16$) between the body mass and the hormone irisin in volleyball players, indicated no correlation relationship positive correlation as a result of the correlation factor ($r = 0.27$) between the body mass and the hormone leptin, indicated no correlation

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relationship positive correlation as a result of the correlation factor ($r = 0.09$) between the body mass and the hormone testosterone [33].

Table 1: The effect of anaerobic exercise in the concentration of certain hormones in a serum The blood of athletes before and after training for the volleyball group

Hormones M \pm SD	Before physical exertion M \pm SD	After physical exertion M \pm SD
Irisin (ng/ml)	3.74 \pm 1.47 A	4.39 \pm 1.49 A
Leptin (ng/ml)	3.47 \pm 0.60 B	1.90 \pm 1.15 A
Testosterone TES (ng/ml)	5.52 \pm 0.56 A	5.90 \pm 0.66 A

Table 2: The relationship between body mass index and hormones in the volleyball player group

Parameters	Body Mass Index (BMI) kg /m ²	Irisin ng/ml	Leptin ng/ml	TES ng/ml
BMI (kg/m ²)	1.00	-0.16	0.27	0.09
Irisin (ng/ml)		1.00	*-0.81	*0.53
Leptin (ng/ml)			1.00	*-0.49
TES (ng/ml)				1.00

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علاقة هرمون الاريسين مع هرمونات اللبتين والتستوستيرون لدى طلاب كلية التربية البدنية

وعلوم الرياضة / جامعة تكريت

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الملخص

تُعد الرياضة الوسيلة الأمثل لتنشيط العمليات الحيوية التي تقوم بها أجهزة الجسم المختلفة وتؤثر الهرمونات على النشاط الحيوي للكائنات الحية فتحدث تغيرات فسيولوجية تشمل كل أجهزة الجسم نتيجة ممارسة الرياضة. إذ تهدف الدراسة إلى معرفة تأثير التمارين الرياضية اللاهوائية في مستوى تركيز هرمون الاريسين وبعض المتغيرات الفسلجية لدى الذكور الممارسين للرياضة ومعرفة العلاقة الترابطية بين هرمون الاريسين والمتغيرات المدروسة والعلاقة الترابطية بين الهرمونات مع بعضها البعض والعلاقة الترابطية بين معيار كتلة الجسم والمتغيرات المدروسة لمعرفة مدى ارتباط معيار كتلة الجسم بالمتغيرات ومدى ارتباط هرمون الاريسين بالمتغيرات ومدى ارتباط الهرمونات مع بعضها أثناء التمرين الرياضي اللاهوائي.

شملت الدراسة (20) عينة من دم لاعبي الذكور لمجموعة لكرة الطائرة من طلبة كلية التربية البدنية وعلوم الرياضة المرحلة الرابعة جامعة تكريت، إذ تراوحت أعمارهم بين (21-26) وخلال مدة دراسية استمرت من شهر تشرين الثاني 2018 إلى شهر كانون الثاني 2019. إذ تم جمع 40 عينة دم، وجمعت عينات الدم في نفس اليوم ولمرة واحدة قبل خمس عشرة دقيقة قبل بدء التمرين الرياضي، ومرة ثانية بعد عشر دقائق من انتهاء التمرين الرياضي الذي استمر لمدة ساعة ونصف.

أشارت نتائج الدراسة عدم وجود فروق معنوية في مستوى تراكيز كل من هرمون الاريسين، والتستوستيرون لدى مجموعة لاعبي كرة الطائرة بعد أداء التمرين مقارنة بقبل التمرين، واتضح من خلال الدراسة انخفاض معنوي عند مستوى تركيز هرمون اللبتين لدى مجموعة لاعبي كرة الطائرة بعد أداء التمرين مقارنة بقبل التمرين.

وبينت النتائج وجود علاقة ارتباط سالبة بين هرمون الاريسين وهرمون اللبتين، بينما كانت علاقة الارتباط موجبة بين هرمون الاريسين وهرمون التستوستيرون، أما فيما يخص هرمون اللبتين فتشير النتائج إلى وجود علاقة ارتباط سالبة بين هرمون اللبتين وهرمون التستوستيرون لدى لاعبي مجموعة كرة الطائرة.

أوضحت نتائج عدم وجود علاقة ارتباط بين معيار كتلة الجسم (BMI) وهرمون الاريسين والعلاقة سالبة، عدم وجود علاقة ارتباط بين معيار كتلة الجسم وهرمون التستوستيرون واللبتين والعلاقة موجبة لدى لاعبي مجموعة كرة الطائرة بالنسبة لمؤشر كتلة الجسم.