THE ROLE OF L-CARNITINE IN THE IMPROVING LIVER FUNCTIONS AND LIPID PROFILE IN VOLUNTEERS FROM KIRKUK CITY [+]

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Abstract :

The dietary supplement industry is constantly developing, continuously offering a wide variety of products for athletes and non-athletes. This study has conducted to investigated the biological activity of L-carnitine on some physiological criteria in the sera of sixty sportsmen (volunteers) male only in age of (18-24) years in Kirkukcity in spring of (2015) , the particular testing period continue for (4) weeks and the volunteers were randomly divided into (2) groups each group include (30) volunteer as following:

The first group of athletes was control groupin which did not supplysupplementations,the second group of athletes who have used L- carnitine (500 mg) per day and an average of twice a day for 15 dayssupplementations.

The results have been indicated the following: The sportsmen whom received L- carnitine every day for 15 days showed a significant increase in the concentrations of High-density lipoproteinHDL –cholesterol while there was a significant decrease in the concentrations ofAspartate Transaminase (GOT) ,Alanine Transaminase (GPT) andAlkaline phosphatase(Alp) enzymes , total cholesterol(Cho) and Triglycerides(T.G) in comparison with control group before and after the exercise. The current study revealed that using L-carnitine as supplements for sportsmen have an important effects on most of physiological and biochemical activities of the body and a positive effect to improve exercise performance.

Keywords:L-Carnitine; liver functions; lipid profile

دور L ـ كارنيتين في تحسين وظائف الكبد والدهون في المتطوعين من مدينة كركوك

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المستخلص:

صناعة المكملات الغذائية تتطور باستمرار، وتقدم مجموعة واسعة من المنتجات للرياضيين وغير الرياضيين. أجريت الدراسة الحالية على ستين رياضي (متطوعين)ذكور فقط في سن (18–24) سنة في مدينة

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كركوك في ربيع عام (2015)، واستمرت الاختبارات لمدة (4) أسابيع ، تم تقسيم المتطوعين عشوائياً الى مجموعتيين كل مجموعة تضم (30) متطوع على النحو التالي:المجموعة الاولى (مجموعة السيطرة)تضم الرياضيين دون اخذ اي نوع من المكملات والمجموعة الثانية تضم الرياضيين الذين استخدموا L- الكارنيتين بكمية (500 ملغ) يوميا وبمعدل مرتين في اليوم لمدة 15 يوما.

هدفت هذه الدراسة التحقق من النشاط البيولوجي لـ L كارنيتين على بعض المعايير الفسيولوجية في مصل الرياضيين

اظهرت النتائج زيادة كبيرة في تركيزHDL -cholesterolفي الرياضيين الذين حصلوا على L . كارنيتين كل يوم لمدة 15 يوما ، في حين كان هناك انخفاض ملحوظ في تراكيز انزيمات GPT ,GOTوAlpوالكوليسترول الكلي والشحوم الثلاثية مقارنة مع مجموعة السيطرة قبل وبعد ممارسة الرياضة.

يستنتج من هذه الدراسة أن استخدام L ـ كارنيتين كمكملات للرياضيين لها تأثيرات هامة على معظم الأنشطة الفسيولوجية والبيوكيميائية للجسم ولها تأثير إيجابي على تحسين أداء التمارين الرياضية.

Introduction :

L-carnitine (β-hydroxy-γ-N-trimethylamino, butyrate) is a compound that describe as water-soluble quaternary amine that is synthesized and produceditalic from lysine and methionine in the brain, kidney and liver of all mammals [1]. It was discovered and found in meat, and was extracted,by Russian scientists, Gulewitsch and Krimberg [2]. It is considered as one, of the dietary supplement, or as a cofactor [3]. L-Carnitine is synthesed in the human brain, kidney and liver by the enzyme acetyl-L-carnitine transferase which facilitates the uptake of acetyl CoA into the mitochondrial for fatty acid oxidation stimulates protein, and membrane phospholipid synthesis [4].

L-carnitine plays an important role in energy metabolism. Its major role appears to be the transport of long-chain fatty acids into mitochondria for oxidation [5]. The dietary sources of L-carnitine are plant and animal sources, plant sources are poor sources, whereas animal sources, are good sources [2]. L-Carnitine affects energy production [6], increases fat metabolism and improves cell energy balance. Furthermore, L-carnitine (esters) removes free radicals [7].

L-Carnitine supplementation, of diet results, in more effective energy production through consumption of fat [8]. Theoretically, an exogenous carnitine supply can decrease the need for, biosynthesis of L-carnitine from, methionine and lysine in poultry nutrition [9]. An increased supply, ofcarnitine has been shown to spare branched-chain amino, acids from oxidation in tissues [10]. So, the aim of study to find role of L-Carnitine in the improving liver functions and lipid profile in volunteers.

Materials and Methods:

Volunteers

The present study included exam (60) of subjects of “male gender only with age range between (18-24) years.This study way conducted at Kirkuk University.The study

period was spring 2015 the subjects were randomly selected and divided into two (2) experimental groups, each group included (30) subjects:

1- **Group1:** (control group). In this group, the subjects did not supply supplementations and the blood samples were taken before the exercise and fifteen minute after the exercise.
2- **Group2:** The subjects in this group were given L-carnitine (500mg) daily for 15 days**.**
In this group, the blood samples were taken before the exercise and the subjects were

given tablet of L-carnitine and taken another blood samples after exercise, after 15 days of consumption of 15 tablet of L-carnitine (one table daily).

The blood samples were taken before and after the exercise. After 15 days of leaving L-carnitine another blood samples were taken from the subject before and after exercise. The blood samples were putted in anticoagulant free test tube. After a lapse period of 15 min in room temp the sample centrifuged for 15 min at 3000 rpm then the serum is separated and kept temporarily in clean pane tube in -20°C for later determination of biochemical and physiological tests, such as Aspartate Transaminase (GOT), Alanine Transaminase (GPT), Alkaline phosphatase (Alp),Cholesterol (Cho), Triglycerides (T.G) and High-density lipoprotein(HDL) – Cholesterol.

Measurements

The measurements of all parameters (G.O.T), (G.P.T), ALP, Cholesterol,(T.G) and HDL – Cholesterol were done by using the technique according to the instructions of manufacturer company kit (Randox).

Statistical Analysis

The data of study samples was collected and analysed statistically by using program (SPSS10) of windows. Including (Mean ±S.D). The significant differences at level ($p<0.01$).

Results

GOT, GPT and ALP

The levels of GOT, GPT and ALP before (21, 4 and 7 respectively) and after (19, 4 and 8 respectively) taking L-carnitine. Also, The levels of GOT, GPT and ALP before (18, 4 and 8 respectively) and after (18, 4 and 6 respectively) leaving L-carnitine show high significant decreased ($P< 0.01$) compare with control subjects before exercise (20, 5 and 9 respectively) and after exercise (28, 10 and 12 respectively) as show in figure (1,2 and 3) and table (1).

Figure 1: Effect of receiving L-carnitine (daily) on GOT concentration in serum of sportsmen for 15 days before and after exercise.

***Note: same letters mean non-significant changes and different letters mean significant changes.**

Figure2: Effect of receiving L-carnitine (daily) on GPT concentration in serum of sportsmen for 15 days before and after exercise.

Figure 3: Effect of receiving L-carnitine (daily) on ALP concentration in serum of sportsmen for 15 days before and after exercise.

Cholesterol, triglyceride and HDL

The levels of cholesterol, triglyceride and HDL before (145, 77 and 41 respectively) and after (123, 82 and 43 respectively) taking L-carnitine. Also, The levels of cholesterol, triglyceride and HDL before (122, 80 and 46 respectively) and after (124, 108 and 45 respectively) leaving L-carnitine. The levels of cholesterol, triglyceride show high significant decreased (P< 0.01), while the levels of HDL level show high significant increased (P< 0.01), compare with control subjects before exercise (130, 103 and 40 respectively) and after exercise (153, 116 and 41 respectively) as show in figure (4, 5 and 6)and table (1).

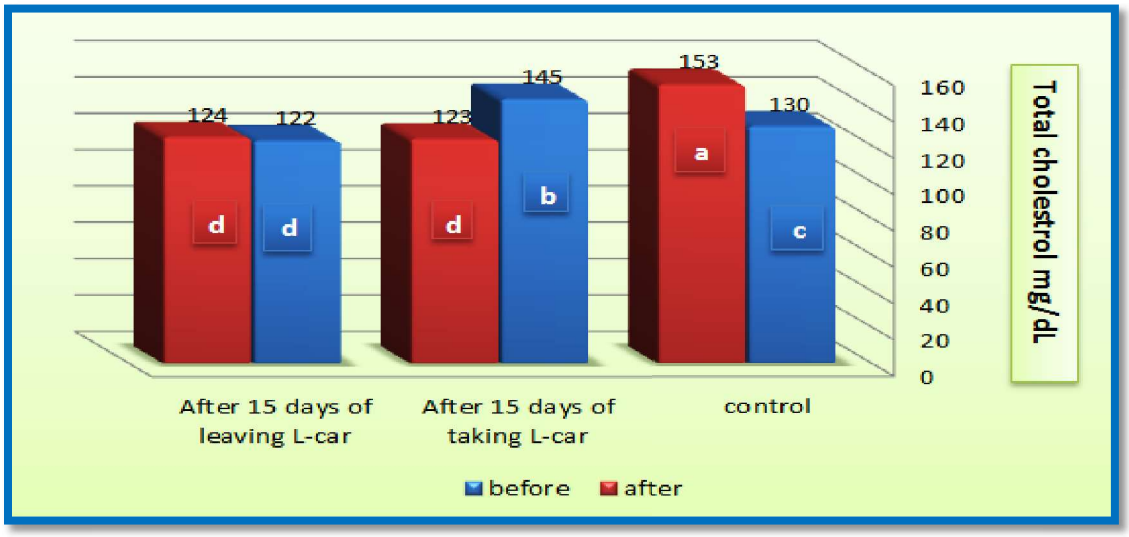

Figure 4: Effect of receiving L-carnitine (daily) on cholesterol concentration in serum Sports men for 15 days before and after exercise.

Figure 5: Effect of receiving L-carnitine (daily) on Triglycerides concentration in Serum of sportsmen for 15 days before and after exercise.

Figure 6: Effect of receiving L-carnitine (daily) on HDL concentration in serum of sportsmen for 15 days before and after exercise.

***Note: same letters mean non-significant changes and different letters mean significant changes.**

Table (1): levels of all parameters in both groups of study

Group / Parameters		Control	After 15 days of taking L-car	After 15 days of leaving L-car
GOT	Before	20±2 b	19±2 b	15±1 c
	After	28±3 a	21±1 b	18±3 d
GPT	Before	5±1 b	4±1 b	4±1 b
	After	10±2 b	4±2 b	4±1 b
ALP	Before	9±2 b	8±1 b	8±1 b
	After	12±2 a	7±1 b	6±1 c
T.S. chol.	Before	130±12 c	123±9 d	122±11 d
	After	153±16 a	145±13 b	124±9 d
Tri	Before	103±7 c	77±5 e	80±9 d
	After	116±13 a	82±6 d	108±8 b
HDL	Before	40±3 c	41±1 c	46±4 a
	After	41±2 a	43±1 b	45±3 a

Discussion :

L-carnitine was used as feed additives in poultry diets to increase yield, to help and improve feed efficiency [11]. L-carnitine has been considered a hypolipidemic agent lead to decrease the levels of cholesterol and triglyceride. Supplementation studies show that the exogenous carnitine lead to decrease the levels of plasma VLDLin rabbits and plasma lipoprotein levels in type 2 diabetic patients with hypercholesterolemia [12].Current study results showed decreased in the levels of GOT, GPT, ALP, cholesterol, Triglyceride and increased in level of HDL compared with control subjects that is in agreement with study of Mosah *et al*. (2015) who referred that the L-carnitine has been important role in obese females. They used sixty obese women to show the effect of L-carnitine on liver functions and levels of lipid profile parameters. They found in the end of the study that the women used L-carnitine were shown decreased in levels of AST, cholesterol, triglyceride and HDL compared with control women. They suggest that L-carnitine improves biochemical parameters associate obesity especially lipid profile and correct liver functions [13].In a study carried out by Keskin et *al.* (2015) to show the role of L-carnitine on liver functions. They found after administration of rats with L-carnitine that the levels of GOT, GPT, ALP, show significant decreased compare with normal rats. They suggest that the using of L-carnitine protects the liver from damages and many disorders [14]. In a study of Elgazzar et *al*. (2012) referred that the L-carnitine has good effect on liver functions in rabbits. They found after administration of rabbits with L-carnitine that the levels of GOT, GPT, ALP, cholesterol, triglyceride show significant decreased and the levels of HDL show high significant increased compared with control rabbits. They suggest that the L-carnitine supplementation improved peripheral and hepatic fatty acid β-oxidation [15].

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