

The effect of eight weeks of β -alanine supplementation and pyramid resistance training on carnosine and IL-8 in non-athlete men

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ABSTRACT

The purpose of this research is determining The effect of eight weeks of β -alanine supplementation and pyramid resistance training on carnosine and IL-8 in non-athlete men. In this job 40 young(ranging from 20 to 25 years old) non-athlete men were chosen and randomly sorted into 4 groups of " β -alanine supplementation", " β -alanine supplementation consumption plus exercise", "placebo users" and "exercise besides the placebo";10 men for each. The resistance training were carries out for 8 weeks, 3 sessions each and up to the 70 to 90 percent of the intensity of a maximum frequency. The "only supplement" and "supplement plus exercise" groups each received 3.2 grams of supplement, 2 times during the 8 week research and the first group had three portions of exercise each week.The other 2 groups (the placebo & placebo beside the exercise) had the same pattern except they received the dextrin powder encapsulated in the similar capsules.Some measurements of hypertrophy (measuring the circumference of the breasts and the arms) and blood samplings were carried out to determine the levels of carnosine and IL-8, in 2 phases (one 24 hours before the test started and the other after the 8-weeks test was finished).To check the changes from before until after the test, the "correlated t" was used and the one-way Analyse of Variance (ANOVA) in order to compare the 2 groups, and in case of observing significant results, the Bonferroni tracking test was based for the action.In this research the p, equal or less than ($P \leq 0.05$), was regarded as significant.The 8-weeks period of pyramid resistance training along with beta aniline supplement resulted in a significant levels of carnosine ($p=0.01$).interleukin8 levels were also rose but not so significant ($p=0.46$).In general, this research showed that pyramid resistance training along by beta aniline supplement ends to a significant carnosine and muscular hypertrophy in non-athlete men. And this is a reason for a rise in the volume of muscles, strength, and fatigue is reduced.

Key-words: pyramid resistance training, carnosine, IL-8, hypertrophy, body mass index, non-athlete men

INTRODUCTION

As time passed ahead, the athletes' level of skills rose and their records has reached new stages and therefore the difference between the success and the failure has always been shortened. That's why the athletes and the trainers are now searching for any petty factor that may increase the chance for the win. For this, one can see using the supplements among the athletes has widely grown. Among all the available supplements, the beta aniline has had a special position for exercises and many physiologists have been working on that, claiming it would improve the strength and the power of the muscles[1].the consumption of protein supplements containing commercial amino acids and doing heavy strength exercises to extend the volume of muscles(hypertrophy) has prevailed in order to gain a better appearance and a fit body ,being successful in matches, and gaining strength (for men) It is proven that

some special types of amino acids could affect the anabolism and the growth of the body and hence, have the potential to develop muscles and reinforce their power during the strength workouts. variant amino acids due to the various speeds of absorption, difference in the profiles of the amino acids, unique hormonal reaction or a positive effect on the antioxidant defense of the body may affect the results of the strength practices. [2]. Beta aniline is an unnecessary amino acid and the internal enzyme per-maker of this supplement is composed of carnosine and histidine and is also called amino propanoic, 3 [3]. The carnosine is synthesized of histidine and the Alanine amino acid in skeletal muscles during a catalyzed reaction by the carnosine synthetase. The concentration of the beta aniline along with the carnosine and histidine in quick contracting muscles is 20 mmole/kg and is 5 to 10 mgrams in the total plasma of the blood. Since the carnosine is more willing to react with the histidine and also the concentration of histidine is more than alanine, it is obviously sensible that the synthesis of carnosine would be more in the presence of alanine, because a mixture of the 2 enzymes exists in it. Accordingly the support of this buffer and its physiological role in introverted contractions and in high intensity actions that will cause the gathering of hydrogen ions would be significant. [4,1,5]. beta aniline like as tampon, could have an important role to keep the balance of hydrogen ions, causing delays in the creation of lactic acid, reducing cell oxidative, preventing the gathering of free radicals, keeping the storages of glycogen, increasing the cell mobility and quickening the response to the coupling of the spastic proteins (Myosin and Actin), increasing the metabolism of the fats, decreasing the neural-muscular tiring, preventing the drop of RNA in kidney, disposal and decreasing the CO₂ in inter-cell exchanges, repair and maintenance in hemostasis and preserving the balance of acid-base conditions of the body. It also could have an important role according to the compositional role of the carnosine and histidine as an enzyme, in increasing the protein synthesis and calcium releasing from the sarcoplasmic network and the creation of working potential [4,6,7,8]. An effective strength program requires a composition of intensity, duration, number of sessions and the type of practice making the body ready to bear and cope with extra loads in different parts of it and to adopt itself. Strength practices result in the development of the strength and the mass of muscles. Among all the strength programs, the pyramidal ones which increase the strength of a single or a group of muscles against an external load in a gradual percent based manner according to the increasing load principle is magnified and studied [9]. Strength practices like weightlifting, power lifting and body building follow some methods to increase the performance and power in specific frequencies and intensities. Skeletal muscles are shapeable tissues which would change the amount and the type of its proteins in reaction to cell hemostasis. One of the motors or provokers of the temporary changes in hemostasis is the strength practices that would show up as the structural and functional adoptions in the protein portion of the muscles. Among which the role of beta-alanine is of importance for keeping the protein synthesis and body hemostasis [10,11]. Some researchers fulfilled a study in 2 weeks and through which studied the impact of the consumption of the beta-alanine supplement in isokinetic practice adoptions and the maximum flexion of the knee and the carnosine content in slow and quick contracting muscles on 14 men divided into 2 groups, "supplement" and "placebo". The results of the research showed that the level of carnosine had meaningfully increased in both legs. The skeletal muscles' tissues release some Saito Cayennes like: TNF- α , IL-6, IL-8, IL-15 and IL-18, that are a few increased for unknown physiological reasons as the muscle contraction or "Bain gene" happens. Some Saito Cayennes are strong messenger molecules which trig and improve the muscular hypertrophy in response to strength exercises. Among these the interleukin 8, is generated by endothelial and epithelial Leukocytes and fibroblasts which have local effects on the brain and the skeletal muscles. Researches show that the release of interleukin 8, has the role of angiogen (generating blood vessels generating) in muscles while doing exercises. Histidine also works as an amino acid for the generation of the spherical proteins which function as the cell enzyme band in the structure of the cell by increasing the rest levels of the interleukin 8 (as an anti-inflame enzyme) results in an increase in the level of the hormone of growth, the oxidative reduction of the fat storages in the body and helps the muscular hypertrophy. [12]. Richman et al (in 2004) studied the impact of 10 weeks of strength exercises on the plasma concentration of interleukin 8. The result of the job showed that the plasma concentration of interleukin 8 had a meaningful increase at the end of the of the 8-week strength exercises [13]. Louis et al, in 6 tests, also studied the effect of an 8-week term of strength exercises in the amount of changes in the mRNA and interleukin 8 resting areas on the wide outer muscle; at the end of the 8 weeks of exercises no meaningful impacts were observed in the level of interleukin 8. [14]. By imposing the pyramidal strength practices protocol along with using the beta aniline supplement for 8 weeks, all the mechanical and physiological adoptions are led to a peak level and also a gradual percent based rise is imposed on the extra load of practices as the protein synthesis becomes more by consuming the beta aniline. Regarding these 2 notes, these questions would come up that whether or not the use of the supplement while doing pyramidal strength practices would lead to any rise in the levels of carnosine? Or if a muscular hypertrophy could be recorded or not? And whether or not we could observe any differences in the levels of carnosine, regarding different intensities of pyramidal strength practices? In this research some factors like the diet, controlling the other physical actions (not involving the defined exercises), genetic characteristics and genetic structures were out of the control of the researcher. Accordingly, this research is going to inspect and study the impact of an 8-week term of using the beta aniline besides the pyramidal strength exercises.

MATERIALS AND METHODS

The present method of doing research is the semi-experimental kind .considering the time needed to fulfill it, the scheme is a short-term one and regarding the gained results it is a practical and handy one. The statistical population of this research were composed of young men in the ages ranging from 20 to 25, having a mean weight of 63-73 kgs and 175-181 cms of stature. Their fat body index was 20-22 kgs per square cms, all coming from a bodybuilding complex situated in Shahin Shar, Isfahan province, Iran.40 men were randomly divided into 4 groups of 10: "supplement", "supplement and practice", "placebo" and "placebo besides practice" .each group were tested 2 times; one before the experiment was started, and one after the experiment. The conditions to let the men in the experiment were: Having an overall level of body and psychological hygiene and guys who had problems regarding heart or vessels, diabetes, hormone disorders, kidney or liver illnesses, surgery, being a cigarette addict, having regular exercises, using supplements or any medical interference affecting the lab results. to homogenize the groups, before the test, they were compared regarding age, stature and weight and proved of no meaningful difference in the statistical point of view.(table 1).all the attenders were received a piece of printed information and were asked to sign declaring they are content to take part in the experiment.

The research, also was under the inspection of expert doctors and physiologists and all the participants were asked to fill some special forms out to make sure they have no backgrounds of illnesses in relation with heart or vessels, high blood pressure, diabetes or illnesses regarding liver or kidney that are capable to influence on the variants aimed to be measured. The participant all got acquainted to the way they were about to do their practices and how to sample their blood, in one session. In order to omit the factors that might affect and disturb the results and to reduce the effect of the type of food they might had eaten, on the Inflammatory markers, the participants were asked not to consume drinks containing caffeine or fast foods at least 24 hours before their blood samples were taken and they had started to exercise .

Table-1 The homogeneity of the participants regarding the demographic characteristics before the exercises

Variants	supplements	exercise and supplements	exercise and placebo	placebo only	p value
Age(in years)	22.3±0.67	22.40±-69	23.10±-0.73	22.90±-1.19	0,12
weight(in kgs)	63.70±-12.50	69.30±-8.40	73.20±-11.43	73.75±-124.90	0,19
height(in cms)	175.9±-3.69	178.7±-8.12	181.7±-5.12	177.8±-4.36	0,15

Exercise training protocol

The blood samples were tested 2 times: first before the exercises start and second after the last session of exercise at the 8th week. The blood taken from the participants each time was 5 cubic cms. The 2 groups of "supplement consumers plus exercise" and "placebo plus exercise" took part in the exercises' protocol and the 2 others did no exercise. The exercises program included 8 weeks of pyramidal strength exercises with the intensity of 70-90 percent of 1RM and the extra load principle was followed.

Measurement of carnosine and IL-8

The preciseness in measurements was by 0.01 meters for stature and 0.1 kilograms for weight. And the blood samplings were both at 5 PM. to determine the carnosine level of the blood samples the glory kit, (produced in the US), was used in the ELISA method.

Statistical methods

The results analysis was done in 2, descriptive and inferential, levels. The mean statistical parameters and the standard deviation were used at the descriptive level and at the inferential level the correlated t was the tool to study the changes from before the test till its end in each group. And to compare the 4 groups, the one way Various Analysis(ANOVA) was used. And the Bonferroni test was used in case of meaningful results. The statistical calculations were done out by the spss17 software in a meaningful ($p < 0.05$) level.

RESULTS

The primary data gathered from the groups is presented in table-1, in brief. The comparison of the mean amounts of carnosine - intrkeulin8 - circumference of the breast and arms in different stages before and after the experiment is registered in the table below:

Table 2 the statistical description of the variants of carnosian, intrkolin8, round length of the breast and arms before and after the experiment

	Group	supplement	supplement & exercise	placebo & exercise	Placebo
	Variant	M±SD	M±SD	M±SD	M±SD
carnosine (pg/ml)	before the test	10.58±3.6	126.38±3.60	13.86±6.74	13.76±2.9
	after the test	14.33±4.09	19.86±6.79	13.23±3.23	12.15±2.58
IL8(pg/ml)	before the test	11.74±6.97	12.61±3.3	13.37±6.30	13.94±3.53
	after the test	15.50±7.8	18.70±7.05	14.56±8.61	13.93±2.43
round length of the arms(cm)	before the test	20.03±4.3	21.20±1.93	21.20±3.45	22.66±4.38
	after the test	20.13±4.28	21.30±1.93	21.40±3.45	22.50±4.38
round length of the breasts(cm)	before the test	31.10±2.88	31.25±2.82	31.59±5.31	31.35±3.43
	after the test	31.40±2.75	34.80±0.78	32.40±5.16	30.50±2.27

To compare the members of each group the t correlated test was carried out for interleukin8, the circumference of breasts and the circumference of arms on the participants. (table3).the results showed that the inside-group values of carnosine in the groups of supplement, supplement and exercise, placebo and exercise And the placebo group had respectively rose by 26.16 and 37.66 percent and dropped by 4.68 and 11.70 percent and so the difference was meaningful(p=0.03).And the inside-group values of interlokin8 in the same order of groups had respectively increased by 24.25, 32.56, 8.17 percent and dropped by 0.07 percent and so no meaningful differences were distinguished. (p=0.46)Concerning the inside-group values for the circumference of the breasts in the above mentioned groups the numbers were 1.15,6.75,0.07 and 0.05 of rise and the difference was of course meaningful(p=0.02).About the circumference of arms also, the recorded numbers were 0.09, 10.20, 1.38 and 2.71 percent of rise with the p of 0.04.

Table 3-the inside-group comparison of the variants before and after the exam ,using the integrated t

Group	supplement		supplement & exercise		placebo & exercise		placebo	
	t	p	T	P	t	p	t	p
carnosine	6,07	0,002	2,009	0,01	0,302	0,77	2,94	0,03
interlokin8	1,145	0,2	2,009	0,005	0,547	0,5	0,04	0,9
circumference of the breasts	4,54	0	3,73	0,005	2,17	0,05	1	0,34
circumference of the arms	1,406	0,19	11,74	0	0,01	0,01	1,5	0,16

Table-4 the comparison of the intra-group effect of the variants at the end of the 8th week using the one way variance analysis test

Variants	F coefficient	p value
Carnosine	3,528	0,03
interlokin8	0,86	0,46
circumference of the breasts	3,63	0,02
circumference of the arms	2,911	0,04

DISCUSSION

the presented research proved that there is a meaningful relation of rise between the use of beta aniline supplement along by having pyramidal strength exercises with the changes of carnosine rest levels.(p=0.03).the results were in the same trend with the ones of Hofmann et al (2010) and, Kendrick et al (2009). all suggesting that the carnosine had increased[15,16,17].on the other hand not corresponding with the research results of Kernand Robinson(2009), Hofmann et al (2008) [17,4]. possibly the lack of correspondence is rooted in the exercise program, the duration of the exercises, the period of the research, the type of the participants or the amount of consumed supplements; the participants of the other surveys have mostly been active people and most of the supplement dosages for each portion has been 3.5 grams, in a total period of 4 weeks. While the guys who took part in the present research were inactive people having a dosage of 6.4 grams in an 8 week period. Kendrick and et al(2009) studied the effect of a 4 week period of beta aniline consumption on the isometric power of the quick and slow contracting muscles of the bottom organs, observing a 58 percent rise in the carnosine level, but no functional difference between the right and left legs. [16].Hoffmann and et al(2008), also examined the effect of a 4 week period of beta aniline consumption along with a rise in the volume of exercises up to the threshold of the tiring of the athletes [4] the present research showed as well that doing the strength exercises with the beta aniline consumption would lead to a meaningful rise in the carnosine level in non-athlete men.no exact mechanisms is still known for carnosine rise as a result of strength practices along with beta aniline consumption. Anyway we could definitely say that the carnosine synthesis is enhanced in presence of beta aniline. That's because in the process of the muscles' synthesis, the carnosine is made up of aniline amino acid, histidine and carnosine Synthetase and the enzyme is more willing to combine with histidine, while the histidine is found more in practiced muscles[18]. In the previous studies it was concluded that rising the amount of carnosine is efficient in heavy exercises through rising the number of Actin and Myosin protein

pairings and consequently working potential. While the mentioned carnosine rise happens during long term and continuous strength exercises due to triggering to use muscular fibers and fiber levels' maintenance and repair (and consequently carnosine rise) [1].

The results also showed that the effect of an 8 week term of beta aniline consumption besides the strength pyramidal exercises on the interleukin8 resting levels hasn't had any no meaningful difference.($p=0.46$).the results of this research is at the same trend as Louis et al (2007), Niman et al(2008). reporting no rise and difference in interleukin 8 in strength exercises[19,20].on the other hand the result do not correspond with the ones of Koin et al (2010), Reichmann et al(2004) [18,21]. Possibly one could say the lack of correspondence can root in the exercise program, duration and intensity of the exercises, the age or the exercise Tar. Louis et al (2007), studied the results on 8 weeks of strength exercises for the outer wide muscle on the changing level of the mRNA and resting interleukin8 for 6 participants. but no meaningful rise was recorded for at the end[14].Also, Reichmann et al (2004), studied the effect of 10 weeks of strength exercises on the interleukin 8 plasma areas 'concentration which led to a meaningful rise about the interleukin 8 concentration before and after the period; with 80 percent of IRM[21] .The work showed the rise has been due to a rise in the frequency of high volume exercises, which is because of catabolic enzymes' removal the end of the exercises; and also due to the duration of the exercising which all ended to growth hormone and muscular hypertrophy[20,21].The present research also showed that the pyramidal strength exercises and the beta aniline supplement did not yield to a meaningful rise for nonathletic men. The exact mechanism of interleukin 8 rise, due to the strength exercises and beta aniline supplement still is not exactly known. But we almost know the role of interleukin 8 in recalling the immunity cells of the body to the inflamed parts and easing the process of Leukocyte and Lymphocytes conveyance through the Lymphatic tissues and complementing the non-Lymphatic tissues and the angio-generating process in muscular tissues through interleukin 8 immunity levels. It also plays an initial role as an agent for growth and muscular hypertrophy. And the anti-inflaming Como toxic role of it in next phases of exercises is proved [21]

.the results also showed that using the beta aniline supplement along by pyramidal strength exercises for 8 weeks yields to a significant change in muscular hypertrophy.($p=0.02$).the results actually did not correspond to the ones of Kendrick et al(2009),Smith et al(2010),Hoffmann et al(2008) on a 4 week basis of beta aniline and strength exercises. [4, 16,22,4] .from the other side the current research results are on the same wavelength to the ones of Stott et al(2010),Talon et al(2008) [23,24]In general, we could possibly say the differences root in the differences in the exercising schedule, number of exercise sessions, the group of involved muscles, eating diets, participants' genders, their age, the type of muscular tars and the supplement consumption levels. Smith et al (2011), carried out a research and studied the effect of using the supplement plus high intensity workouts on the nerval and body tiring, strength peak, body composition and hypertrophy; but found no change in the body composition and hypertrophy[22] . talon et al (2008), perused the effect of beta aniline supplement besides the strength exercises on the performance indicators of peak strength, BMI (Body Mass Index), Body Fat Index and the hypertrophy. At the end of the tenth week no changes were observed in peak strength for chest pecs and Scott workouts; no change in body fat index but significant changes in chest and thigh hypertrophy [23] .The present research showed the beta aniline consumption plus pyramidal strength exercises would cause a rise in non-athlete men's' muscular hypertrophy, even though no exact mechanisms have yet been discovered for hypertrophy changes using the beta aniline plus pyramidal strength exercises, we could possibly suggest that the muscular hypertrophy is affected from that. Since the beta aniline is an amino acid and the skeletal muscles are made of amino acids. And the carnosine existing in the supplement helps the protein synthesis and protection. And the beta aniline absorption in muscles is through intra cell sodium and chloride amino acid conveyers[24] .more researches is needed to determine if the pyramidal exercises and the beta aniline supplement could affect the hypertrophy and growth agents?

CONCLUSION

the results showed that the beta aniline consumption along by the pyramid resistance training yields in a significant rise in carnosine and hypertrophy. No significant changes were observed in IL-8 levels though, that reveals that the intensity of the pyramidal exercise has been in low levels and so the type of the present exercising system. The pyramid resistance training plus the beta aniline consumption in the dosage of 6.4 grams and the total muscular involvement could create positive effects on hypertrophy and the peak functionality.

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