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Effect of eight weeks of moderate aerobic activity, the changes in obestatin and insulin plasma in male obese sprague dawley rats

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ABSTRACT

Today, a sedentary lifestyle, the risk of metabolic syndrome and two internal secretion, i.e. obesity and diabetes increases. The aim of this study was to compare the effects of two types of exercise, the changes in plasma obestatin and insulin in obese male rats of the sprague dawley. Then, randomly, 50 rats aged three months, were selected and divided into two groups after the exercise and control groups, the 8-week training program conducted. In controlled laboratory conditions, 24 hours after the last exercise, of all groups, blood samples were taken. For the measurement of plasma obestatin and insulin, blood samples to the lab moved. The findings showed that, with practice, obestatin and insulin levels decreased significantly (P=0.05), and between obestatin and insulin reduction, moderate-intensity exercise group, a significant correlation (r=0.048), see are. Results showed that aerobic exercise reduces obestatin and insulin levels in plasma are. May exercise, by improving energy levels in obesity and diabetes might be effective.

Keywords: Obestatin, Insulin, Obesity, Physical activity.

INTRODUCTION

Appetite control, for the treatment or prevention of obesity, is one of the important issues that may affect physical activity can be. One of the most complex physiological mechanisms in the human body energy homeostasis. To maintain energy homeostasis, a complex network of signals, the time and energy costs are. Some endocrine tissues of the body, including the pancreas, adipose tissue, and stomach, a source of energy homeostasis signals, including hormones are secreted from the members in the energy balance, impact, obestatin and insulin [1,2]. Obestatin, a peptide 23 amino acids, that is, the gene pool of ghrelin, the code has been reported that food intake, body weight gain and empty stomach, reduce, and through interaction with GPR39, inhibits movement small intestine [3,4]. It has been shown that this hormone works on gastric motility - intestinal glucose homeostasis, cell proliferation, hormone secretion, thirst, sleep, memory, emotion, hydration, body weight and energy expenditure [5,6].

Insulin and leptin, which is secreted by the adiposities and pancreatic cells are produced signals with long-term obesity, through the Anti - her appetite, eating behavior, affect [7]. Insulin signaling role in energy balance, despite the central insulin, food intake and body weight is suppressed. Also, it has been shown that peripheral insulin, the brain enters into the energy balance, through direct contact with hypothalamic neurons involved in the regulation of appetite is affected. It has been shown that peripheral insulin, insulin receptor substrate hypothalamus, changes, and

the hypothalamic appetite stimulating neuropeptide, under no stress and no hypoglycemia, reduces. Also, experimental studies have shown that neuropeptide levels, peripheral insulin to understand that, as a sign of sensory (afferent), acts to regulate energy balance is important [8].

The research was conducted by Mohebbi et al. (2009), data are indicative of the fact that, after 12 weeks of aerobic exercise of low, medium and high insulin levels, significantly decreased, which could be one reason for the decrease in resistance Insulin is the hormone function [9]. In other research, Reinehr et al. (2008) found that, one year weight loss program involving diet combined with physical activity, weight reduction in obese children, and it increased with reduced insulin in plasma obestatin [10]. In contrast Ghanbari- Niaki et al. (2008) reported that plasma obestatin levels, followed by a bout of resistance exercise of different intensities, do not change [11]. Also, Manshouri et al. (2008), in this study, plasma obestatin levels in response to a short term anaerobic exercise test (RAST), was investigated. RAST test exercise 5 times, 5 min rest interval between innings per session, for 6 consecutive days, respectively. Significant changes after 24 h, 48 h, and for the first 7 days of recovery, plasma obestatin levels were observed [12].

In a study to determine the levels of plasma obestatin and stomach, in response to endurance training in Wistar rats was performed, results showed that resistance exercise reduces obestatin stomach, which increases liver glycogen in experimental group, whereas [13].

Hormones on obesity, health, weight control and appetite, this study seeks to answer the question, the eight-week aerobic exercise, a significant influence on the changes of plasma obestatin and insulin, may be?

MATERIALS AND METHODS

50 obese male rats of the sprague dawley, with an average weight of 320±20 g, Laboratory Animal Research Center, Shiraz University of Medical Sciences, were prepared. Mice, in groups of 5 each, and the average ambient temperature of 22± 1.4° C, humidity of 55.6±4, and the light cycle-Darkness 12:12 pm, were kept. All animals, especially food and water rats had free access (average daily food intake of rats, 10 g per 100 g body weight). After three days, the subjects were familiar with the laboratory, randomly divided into experimental and control exercise, respectively. Each group was composed of 25 mice. Rats in the exercise group, 8 weeks, and each week, 5 days, rehearsed. The total training period, two introductory courses and extra time was divided. In phase (first week), rats, every day, for 10-15 minutes, at a speed of 12 meters per minute on the treadmill walked. The extra time (weeks), rats first 15 minutes, and the speed of 12 meters per minute on the treadmill, walked, and gradually over the next few weeks, the intensity and duration of activity increased to levels the final velocity of 20 meters per minute, and 50 minute time period, reached. In addition, total operating time, 5 minutes to warm up and cool down for 5 minutes, were considered. 24 hours after the last training session, all rats, the first digital scale, and with a mixture of xylazine and ketamine were weighed amount of 80 to 10 mg ketamine xylazine, per kilogram of body weight, were anesthetized. The identification of the heart with a syringe, the heart, the blood, and the tubes containing 200 ml solution of EDTA, were cast. All samples for 15 min, and the speed of 3000 rpm, were centrifuged. Serum obtained for subsequent measurements, the temperature of -70 ° C was maintained. To measure hormone obestatin and insulin ELISA kits, made in America, was used.

In this research, statistical analysis, and comparison between groups, ANOVA and Tukey test were used, as well, to get the relationship between variables, the Pearson's correlation coefficient was used. All calculations using SPSS software version 16 and the significance level of the test, $p<0.05$, was considered.

RESULTS

After eight weeks of aerobic activity, and obestatin plasma insulin levels, no significant difference in the exercise group and control group, respectively.

Mean plasma obestatin, after 8 weeks of aerobic exercise group than in the control group was lower. The mean and standard deviation hormone obestatin, moderate intensity exercise and control groups, respectively, 198.339±23.046 and 151.160±34.39 respectively.

Table 1: Mean and standard deviation of obestatin in the exercise and control group

Group	Mean	Standard deviation	Minimum	Maximum	Number
Control	198.339	23.046	156.7	235.8	23
Exercise	151.160	34.394	74.16	221.7	24

The mean and standard deviation of the insulin hormone, exercise and control groups, respectively, 2.238±0.677 and 1.231±1.703, was obtained. Average insulin, exercise group compared to the control group is lower.

Table 2: Mean and standard deviation insulin control and exercise group

Group	Mean	Standard deviation	Minimum	Maximum	Number
Control	2.238	0.677	1.200	3.500	23
Exercise	1.231	1.703	0.170	7.946	24

Significant correlation between changes in insulin and obestatin in the aerobic exercise group, there. Significance level of 0.05, and the correlation coefficient of 0.048, respectively. So, between obestatin and insulin levels, in practice, there is a correlation, indicating that the relationship is significant, and can be stated that the mechanism of secretion of these two hormones in exercise of moderate intensity, they are interdependent.

Table 3: The relationship between obestatin and insulin changes in moderate-intensity aerobic exercise group

Variable		Insulin	Obestatin
Insulin	Pearson's correlation coefficient	1	0.407
Obestatin	Significant	0.048	1

DISCUSSION AND CONCLUSION

The aim of this study was to examine the effects of eight weeks of aerobic exercise, the changes in plasma obestatin and insulin in obese male rats of sprague dawley, respectively. Findings the study indicates that, obestatin and insulin plasma levels after 8 weeks of aerobic exercise, was significantly reduced. Some studies have shown that, obestatin plays an important role in energy balance and weight control, is [2,3,13]. Regular physical activity, the rate of oxygen utilization, increase to [10], and insulin resistance, and reduces the risk of obesity, minimizes, and prevents Overweight is. Therefore, we can say, doing physical activity regularly, can play a role in the prevention and treatment of obesity, insulin resistance and cardiovascular disease, may be associated with.

The factors affecting energy balance increase or decrease in muscle glycogen is. Reduced insulin stimulates enzymes phosphorylase and glucose phosphatase, glucose goes in and out of the liver and enters the blood increases, and it is perhaps for this reason that the increase in energy consumption, followed by exercise limited to food, hunger, the delays, and ultimately, the obestatin and insulin levels, reduce. On the other hand, the research, the findings Manshouri et al. (2008), Wang et al. (2008), Xu et al. (2007), Ghanbari-Niaki et al. (2008), Reinehr et al. (2008), Zhao et al. 2008, the counter is [10,11,12,14,15,16].

he research, Manshouri et al. (2008), plasma obestatin levels in response to short-term aerobic exercise test (RAST), were examined, in which no significant changes in plasma obestatin levels was observed, and it seems like a short activity term effect of obestatin does not [12].

In another study, Wang et al. (2008), obestatin levels in the hypothalamus of obese mice, in a short period of activity (40 minutes of running on a treadmill with a slope of 5 degrees and a speed of 20 meters per minute), were measured. The findings of this study, no significant changes in plasma obestatin levels after a single bout of activity were observed [13]. Also, research Xu et al. (2007) showed that electrical stimulation of the stomach two hours/intestinal mice, the obestatin have no effect [15]. In this study, 8 weeks of aerobic exercise, and insulin plasma levels of obestatin, has come along. Hickey et al. (2002) in the research was conducted, found that 12 weeks of exercise, with no change in body fat or body weight, serum insulin and 19% in women, has decreased. Muscles involved in the exercise, to supply more fuel to glucose, they depend, and therefore, in exercise of long-term, very

much involved in the regulation of glucose is. On the other hand, the insulin concentration in the blood during prolonged exercise, reduced glucose uptake (glucose), condensation of 10 to 20 times, is added. Plasma insulin levels, slowly (about 26%), to the exercise of its value at rest was reduced. Insulin can regulate the amount of leptin may be effective, and leptin, the proteins to reduce their weight and increase metabolism [16].

Trained with mean 5.18±5.1 and BMI 8.24±81.6, on a voluntary basis, selected and randomly divided into experimental and control groups. The variables measured were: plasma glucose and ghrelin, growth hormone, cortisol, and insulin levels, the plasma ghrelin, ELISA, glucose enzymatic, and the rest by radioimmunoassay kits were measured. For data analysis, a statistical method T-test was used. The results showed that six weeks of wrestling and wrestling circuits based techniques result in a significant reduction in growth hormone, cortisol, and insulin, and a significant increase in ghrelin (16). In 2008, Reinehr et al. (2008), the impact of an intervention in diet and physical activity on serum levels of ghrelin and obestatin in obese children with a mean age of 11.2 years, was studied. This was the first study which levels of ghrelin, obestatin, and changes them, after weight loss due to interference with physical activity, high carbohydrate, low fat diet, can be assessed. Before the intervention, compared with a control group of obese children have higher levels of obestatin and ghrelin levels lower, respectively. The researchers believe that, higher obestatin and ghrelin levels in obese children below shows the process of adaptation to weight gain, because ghrelin stimulates weight gain, and obestatin, ghrelin acts as an antagonist, is considered. Looking for weight loss in obese subjects, obestatin levels, increased ghrelin levels, but the increase was not significant, and ghrelin to obestatin ratio, showed a tendency to decrease.

On the other hand, the children who had significant weight loss, ghrelin levels, obestatin, and ghrelin to obestatin ratio, significantly, did not change. In fact, the high carbohydrate diet, low fat, and physical activity, leading to weight loss and as a result, leptin and insulin levels reduce, and obestatin levels increased, while levels of ghrelin, showed no significant change. Researchers have argued that obestatin may increase after weight loss is a mechanism for maintaining weight loss is established [10]. On the other hand, this study was conducted on the children, it may affect the results, have been influential. Also, application, severity, and duration of exercise, and dietary intervention, other factors, the differences are.

Saghebjoo et al. (2009), in a research conducted on young women, resistance training program for 4 weeks, 4 days per week, and each session, were examined. 80% of one repetition maximum intensity resistance training resulted in a significant reduction in plasma levels of obestatin, was. Obestatin hormone, with energy balance, the relationship is. The factors that influence energy balance, increase or decrease in glycogen, is [18]. Several studies have shown that weight training leads to an increased breakdown of glycogen, and an energy deficit, and after heavy exercise, protein synthesis and glycogen restoration, is delayed and slowed. On the other hand, the activities of eccentric, muscle damage, and defects in glycogen re-synthesis, the activity will be. Studies have shown an increase of insulin on the uptake and transport of glucose by muscle, the protein content of transmitter glucose-4 (GLUT-4), a positive correlation, and found that the content of GLUT-4 in muscle, with muscle glycogen levels, has a direct relationship, therefore, defects in muscle glycogen re-synthesis following eccentric exercise may be due to the reduction of GLUT-4-induced muscle damage, is, and looks, intensity resistance training above, may be due to damage to the muscle fibers, and a delay in restoring muscle glycogen, leading to a negative energy balance in the body, and in response to that, obestatin levels, and decreased levels of ghrelin to obestatin ratio, increased , the energy lost by the body's reserves, to offset [4].

The overall conclusion from this research indicates the positive effects of aerobic exercise on metabolic parameters, such as obestatin and insulin. Deviation obestatin and insulin plasma levels was significant and positive correlation between obestatin and insulin, as well as a significant reduction in these variables, the promise of possible improvements obestatin and insulin plasma levels, resulting in a practical way, does. The findings of this study, the role of moderate aerobic exercise, the favorable changes in body composition in obese subjects, emphasizes. Due to this, hormonal and metabolic changes caused by the cardio with resistance training are completely different, yet research work on the effects of exercise there. The effect of exercise on other metabolic parameters, and using a special diet can be an important area of research to be considered, or using other training methods, and compared with current training methods also can be interesting for future research, is considered.

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