

ORIGINAL ARTICLE

Adipocytokine Resistin as an Inflammatory Cytokine does not alter by Exercise test in Adult Males

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ABSTRACT

Resistin, an adipocyte-derived factor, has been shown to be associated with obesity and inflammatory conditions such as insulin resistance and type 2 diabetes. To evaluate serum resistin response to one session exercise in obese men, fourteen inactive adult obese men aged 39 ± 2 year and body weight 93.5 ± 6.1 kg performed an exercise test included 40 min running with moderate of intensity. Before and after an effort the blood was taken to evaluation of serum resistin level in studied subjects. Pre- and post exercise serum resistin were compared using a paired-samples t-test. An alpha-error below 5% was considered as statistically significant. No significant differences were found in serum resistin values between pre and post-exercise in studied subjects. This finding indicates that exercise test for one session does not affect inflammatory profile in sedentarily obese men.

Keywords: Resistin, Exercise test, Sedentarily, Obesity

Received 12/04/2014 Accepted 10/05/2014

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How to cite this article:

Sokhanguie Y, Hajirasouli M, Afsharmand Z, Hajirasouli M. Adipocytokine Resistin as an Inflammatory Cytokine does not alter by Exercise test in Adult Males. Adv. Biores. 5[2] 2014; .DOI: 10.15515/abr.0976-4585.5.2.1417

INTRODUCTION

Health science researchers mainly focused on the importance of mortality caused by obesity-related chronic diseases. Scientific sources indicate the role of obesity in prevalence of many chronic diseases such as type 2 diabetes, different kinds of cardiovascular diseases, respiratory diseases, and other irregularities related to metabolic syndrome [1, 2, 3]. Today, it has been discovered that in addition to type of diet and inactivity, disorders in hormonal profile or inflammatory profile are also related to obesity and its related diseases [4, 5]. The relationship between adipocytokines secreted from adipose tissue and other tissues of body and the role and relationship among resistin inflammatory hormone and obesity and its related diseases were brought about many times [6]. This 12.5 kDa inflammatory adipocytokines was first discovered in 2001 [7].

It has been discovered that systemic levels of resistin in animal models or obese human populations is far higher than the ones of thin populations or lean people with normal weight [8, 9] so that a direct and significant relationship was seen between Body Mass Index (BMI) and size of visceral fat [9]. Others deny any relationship between plasma concentrations of resistin and BMI [10]. Although adipose tissue was introduced by the most important sources of its secretion, it is also secreted by other tissues such as pancreas, muscles, mononuclear cells, and placental [11]. However, it has been known that in spite of resistin expression in mice, human resistin is expressed primarily in macrophages rather than adipose tissue [12]. Its role in dysfunction of insulin, glucose homeostasis, and insulin resistance, especially in obese individuals, was brought about several times [13].

Changes of life style, nutritional behaviors and physical activity play a crucial role in systemic levels of the peptides secreted from adipose tissue and other factors affecting obesity and insulin resistance. A group of studies pointed out the prominent role of exercise and diet in regulating levels of these inflammatory cytokines [14]. However, some studies did not report response of resistin and other adipokines such as adiponectin, leptin and interleukins to exercise complications [15]. Although researchers attributed the contradiction in their response to long-term exercise programs to type of exercise program, type of measuring tools, duration, intensity or repetition of exercise sessions [16, 17], the role of a session of exercise test on resistin serum levels as an inflammatory adipocytokine in obese people was not studied sufficiently. Regarding above interpretation,

the present study examines immediate response of serum resistin levels to a single-session exercise test in obese people.

METHOD AND SUBJECTS

In this study, we sought to evaluate the consequence of an acute bout of exercise on serum resistin as an inflammatory adipocytokine in inactive obese men.

Subjects: Fourteen adult sedentary men aged between 34.2 ± 4.2 years and weigh 172.6 ± 4.3 cm with body mass index BMI > 30 participated in this study by accessible sampling. After the nature of the study was explained in detail, informed consent was obtained from all participants. All participants were obese. Subjects with a history or clinical evidence of impaired fasting glucose or diagnosed type 2 diabetes, heart failure, active liver or kidney disease were excluded. Participants were non-athletes, non-smokers and non-alcoholics. All subjects had not participated in regular exercise for the preceding 6 months, nor did all subjects have stable body weight.

Anthropometry: All of anthropometrical measurements were conducted by the same researcher when the participant had thin clothes on and was wearing no shoes. Height and body weight were measured twice, with subjects being barefoot and lightly dressed; the averages of these measurements were recorded. Abdominal circumference was measured after a normal expiration using a non-elastic tape to the nearest 0.1 cm. Systolic and diastolic blood pressure was measured using the left arm after the subject had been sitting comfortably for 5 min, using an oscillometric device (Alpikado, Japan). Body mass index (BMI) was calculated as weight (kg)/[height (m)]².

Laboratory measurements and exercise test: Venous blood samples were obtained before and at the end of exercise test of all subjects. Subjects were asked to avoid doing any heavy physical activity for 48 hours before blood sampling. Blood samples were dispensed into EDTA-coated tubes and centrifuged for 10 minutes in order to separate serum. Serum was analyzed for evaluation resistin. Exercise test lasted 40 min included running on treadmill with no slope at %65 of maximal heart rate. Participants wore heart rate monitors to ensure that they were reaching target heart rate levels.

Statistical analysis: Data were analyzed by computer using SPSS software version 15.0. Normality of distribution was assessed by Kolmogorov-Smirnov test. Pre- and post exercise serum resistin were compared between pre and post-exercise using a paired-samples t-test. A P-value of < 0.05 was considered to be statistically significant.

Results

Table 1 show the descriptive anthropometric and biochemical features of the study subjects. As mentioned above, all participants were obese. There was a positive relation between serum resistin and all anthropometrical markers, but serum resistin was only significantly related with abdominal obesity ($p = 0.043$, $r = 0.55$) and hip circumference ($p = 0.032$, $r = 0.57$) from statistically perspective. Data by T test indicated that serum resistin decreased borderline by exercise test when compared to pretest ($p = 0.054$, Fig 1)

Table 1: Mean of biochemical and anthropometrical markers of fourteen studied subjects

Variables	Mean	SD
Weight (kg)	93.5	6.1
Body mass index (kg/m ²)	31.3	1.0
Systolic Blood (mmHg)	133	21
Diastolic Blood (mmHg)	87	12
Serum resistin, pre test (ng/ml)	10.16	1.90
Serum resistin, post test (ng/ml)	8.41	2.12

DISCUSSION

Although this study reduced serum resistin levels in inactive males through a 40-min running session with relatively moderate intensity, such a reduction was statistically insignificant. Despite the fact that limited studies were conducted so far on immediate and delayed responses of other cytokines such as leptin, CRP, etc to different short- and long-term exercise tests and led to contradictory findings, no research is found in this field with an emphasis on immediate response to a one-session exercise test. Most studies discussed long-term aerobic or resistive exercise or merely sought the immediate impact of an exercise on its serum or plasma levels aiming at determining response of this inflammatory cytokine. However, findings of the most long-term studies accompanied by significant reduction of body weight and improvement of cardiovascular preparedness emphasized improvement or reduction of such inflammatory cytokines following exercise programs or diet.

In this concern, findings of a recent study shows that a weight loss program within a 3-week diet that accompanies weight loss more than 5 percent led to significant reduction of serum resistin levels in obese

females [18]. However, the study of Giannopoulou *et al*, [19] showed that resistin and adiponectin serum levels is not subject to changes in diabetic menopausal females following 14 weeks aerobic exercise with moderate intensity in combination with diet . In another study, an 8-week aerobic exercise did not affect serum resistin levels in overweight children [20]. However, in the study of Park *et al*. [21], a 12-week aerobic exercise led to a significant reduction of resistin in obese middle-aged females.

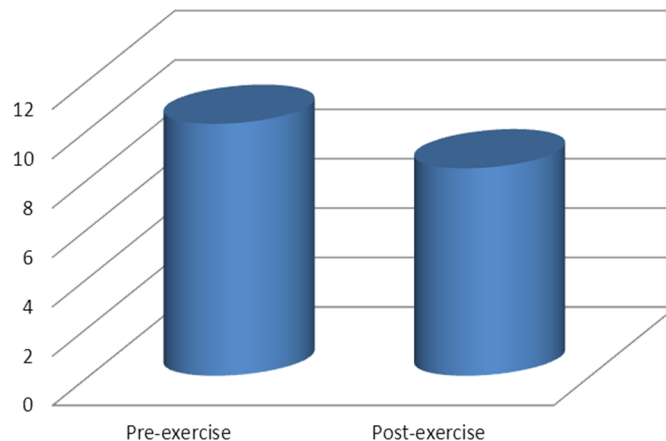


Figure 1: Comparison of serum resistin between before and after exercise in studied group. Data shows no significant difference (borderline decrease) between two conditions.

Based on the findings, it is concluded that no certain mechanism has been specified yet based on which a long-term exercise affect resistin levels and/or other adipocytokines; although, it seems that the type and method of exercise programs and the populations under study are among the major factors involve in the contradictions of findings. Despite contradictions in the responses to long-term exercise programs, immediate or delayed response of serum resistin levels to one-session exercise tests in the healthy and diseased populations has not been studied yet. Apparently, this research was conducted for the first time aiming at determining immediate response of resistin to an exercise test within a relatively long-term running. Some studies pointed out that one-session exercise tests would lead to improving inflammatory cytokines only if they are executed at least for 60 minutes or minimum energy consumption of 800 Kcal [22].

In this concern, findings of the present study showed that immediate response of serum resistin to a 40-min one-session running with intensity of 70 percent maximum heart rate is not significant. In spite of insignificance, the findings showed that its changes tend to reduce. In fact, although such a reduction was not statistically insignificant, it was 13 percent less than the earlier exercise test. These findings showed that as far as clinical perspective is concerned, the exercise test has an inflammatory feature on serum resistin levels in obese males. Based on these evidence, it is concluded that execution of a one-session exercise with moderate intensity by middle-aged obese males even if it is not performed shorter than 60 minutes or carried out by energy cost lower than 800 Kcal - it is not statistically significant and it leads to a considerable reduction of inflammatory adipocytokines such as resistin.

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