Adipocytokine responses to acute exercise in athletes with different body fat content and sedentary controls

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Introduction

Recent research in the biology of adipose tissue indicates that it is far more than a simply an energy storage organ, and it is in fact an active endocrine organ secreting numerous bioactive mediators, called adipokines, including leptin, adiponectin and visfatin (Galic, 2010).

To date, less attention has been focused on the kinetics of adipokines levels during and after high intensity exercise. Several reports pointed at the metabolic role of adipokines during exercise in elite athletes, but the data are currently equivocal (Bouassida et al., 2010; Jürimäe et al., 2011).

Objectives

The aim of this study was to investigate adipocytokine responses to an single bout acute exercise in elite athletes with a low percentage of body fat, elite athletes with a high percentage of body fat and sedentary controls.

Methods

Sixteen athletes with low percentage of body fat (volleyball players, low fat athletes group, LFAG), fifteen athletes with high percentage of body fat (water polo players, high fat athletes group, HFAG) and fifteen sedentary subjects participated in this study (age (years) 20±2; 20±2; 20±1, respectively).

All subjects were exposed to:

1. Anthropometric measurements:
   - Body mass (kg) - digital scale on a flat floor, participants wearing minimal clothing
   - Body height (cm) - tape measure and a set square while the subjects were standing straight against a wall without shoes
   - BMI was calculated using body weight (in kilograms) divided by body height squared (in meters)
   - Body fat percentage was calculated using a digital body fat scale Tanita
2. exercise test on treadmill in order to examine acute changes of adipocytokines.

Blood samples were obtained at baseline levels, immediately after the exercise test and 30 minutes after recovery. Separated serum or plasma were used for hormone (leptin, adiponectin and visfatin) ELISA analysis.

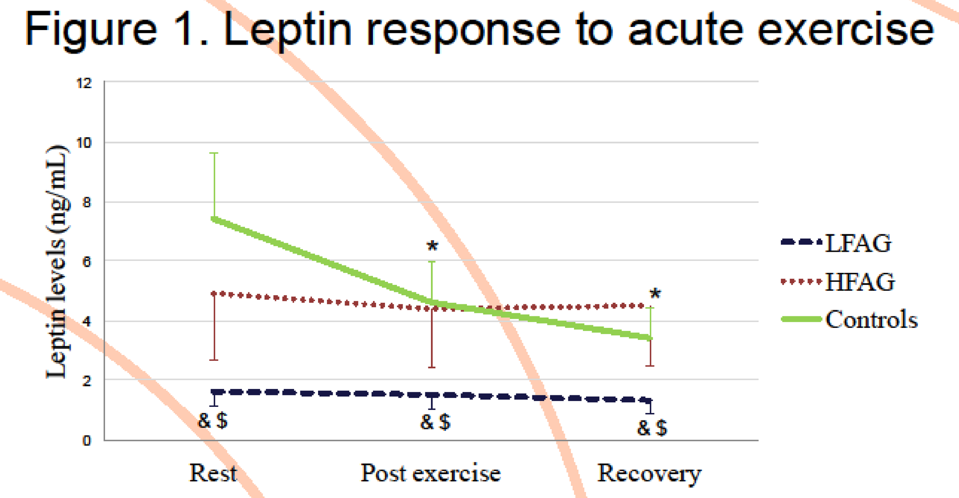
Results

Table 1. Anthropometric characteristic of groups

	Athletes LFAG (n=16)	Athletes HFAG (n=15)	Control (n=16)	p
BM (kg)	**84.3±6.9**	**99.0±11.6**	**90.2±10.4**	**+&**
BH (cm)	**196.3±5.5**	**194.8±4.4**	**184.3±6.8**	***+**
BMI (kg/m^2)	**21.9±1.9**	**26.1±2.9**	**26.5±1.9**	***&**
BF% (%)	**8.4±2.1**	**16.8±2.6**	**17.5±2.9**	***&**

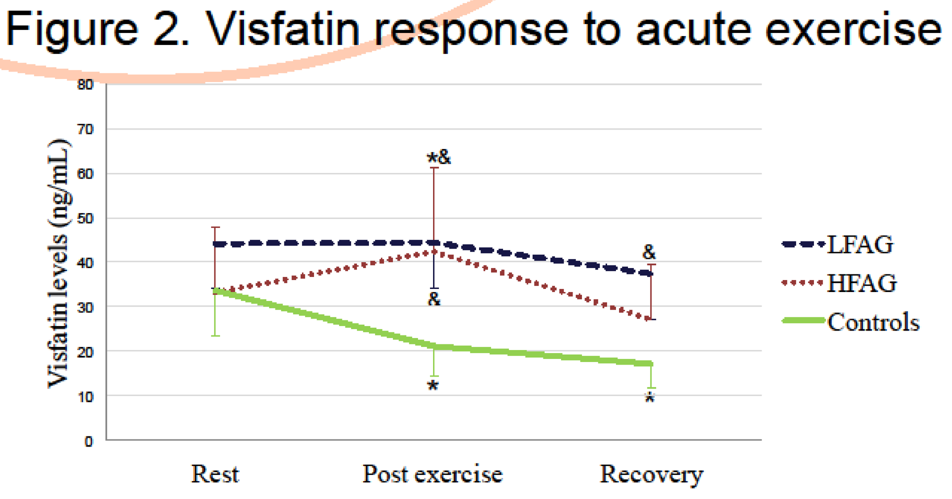
Data are means±SD; LFAG, low fat athletes group; HFAG, high fat athletes group; BM, body mass; BH, body high; BMI, body mass index; BF%, body fat percentage; *, p<0.05 between LFAG and controls; +, p<0.05 between HFAG and controls; &, p<0.05 between athletes

Figure 1. Leptin response to acute exercise



Data are means±SD; LFAG, low fat athletes group; HFAG, high fat athletes group; *, p<0.05, in compare with rest; &, p<0.05 in compare to controls; $, p<0.05 between athletes

Figure 2. Visfatin response to acute exercise



Data are means±SD; LFAG, low fat athletes group; HFAG, high fat athletes group; *, p<0.05, in compare with rest; &, p<0.05 in compare to controls; $, p<0.05 between athletes

In athletes in LFAG, baseline leptin concentration was significantly lower, but adiponectin and visfatin concentrations were significantly higher, compared to sedentary controls and athletes in HFAG (p<0.05, all).
There were no significant post exercise or recovery changes in adiponectin concentration (p>0.05).

Conclusions

Our findings show leptin and visfatin levels, but not adiponectin respond to acute exercise. Acute exercise elicited an inverse visfatin response in athletes in HFAG and controls. Also, these results suggest that leptin is altered after acute exercise only in sedentary individuals.

References:

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