BETATROPHIN – A NEW INSIGHT INTO LIPID HOMEOSTASIS

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Introduction

Betatrophin (ANGPTL8, lipasin, RFI) is a new member of an angiopoietin-like protein family, ANGPTLs exhibit multiple functions, playing a role in lipid and glucose metabolism, inflammation, hematopoiesis, and cancer. Betatrophin is predominantly expressed in liver and adipose tissue. Betatrophin is an atypical member of the ANGPTL family since it lacks fibrinogen-like domain and coiled-coil domain. ANGPTL3 and ANGPT4 play essential role in lipid metabolism [1]. Betatrophin is involved in triglyceride metabolism through its interaction with ANGPTL3 and regulation of lipoprotein lipase activity [2,3]. Lipoprotein lipase binds to the surface of capillary microvascular endothelial cells and hydrolyzes triglycerides in chylomicrons and VLDL, yielding free fatty acids, which are then taken up by peripheral tissues, including fat, muscle and heart [4]. Betatrophin inhibits lipoprotein lipase and suppresses triglyceride clearance which leads to uptake by peripheral tissues, including fat, muscle and heart [4]. Betatrophin binds to the surface of capillary microvascular endothelial cells and hydrolyzes triglycerides in chylomicrons and VLDL, yielding free fatty acids, which are then taken up by peripheral tissues, including fat, muscle and heart [4]. Betatrophin inhibits lipoprotein lipase and suppresses triglyceride clearance which leads to increase in serum triglyceride [1]. Betatrophin is thought to be a potential player in dyslipidemia with a strong association with HDL-cholesterol and also a potential therapeutic tool for treatment of dyslipidemia [6]. Elevated circulating levels of betatrophin have been described in patients with metabolic syndrome and diabetes [3] and in patients after surgically induced weight loss, but not after diet-induced weight loss [5]. Elevated betatrophin was reduced after exercise training in obese [7]. However, the changes in circulating betatrophin levels during food absorption and their impact have not been completely described yet.

Materials and Methods

This study was focused on circulating betatrophin levels in healthy and obese subjects. Serum betatrophin was measured in healthy subjects and in obese patients who underwent three months of prescribed exercise training. In another group of healthy donors, preprandial and postprandial betatrophin levels were analyzed.

Serum betatrophin levels were increased in obese compared to healthy subjects (mean: 24.3 ng/ml vs 12.8 ng/ml). After three month exercise training, circulating betatrophin in obese subjects dropped to 17.3 ng/ml. Mean fasting serum betatrophin level in healthy subjects was 10.1 ng/ml. Two hours after meal, mean betatrophin level raised to 12.2 ng/ml while four hours after meal, it fell to 9.4 ng/ml. Both these changes in betatrophin levels were significant (p < 0.001).

Mean fasting serum betatrophin level in healthy subjects was 10.1 ng/ml. Two hours after meal, mean betatrophin level... four hours after meal.

Conclusion

The results confirm significant increase in betatrophin levels two hours after meal and significant decrease in circulating betatrophin four hours after meal. Our data also show that circulating betatrophin is elevated in obese and can be reduced by exercise training independently of the diet. Our findings indicate that betatrophin plays a role in regulating plasma LDL and triglyceride.

Results

Serum betatrophin levels in healthy compared to obese subjects (mean: 24.3 ng/ml vs 12.8 ng/ml). After three month exercise training, circulating betatrophin in obese subjects dropped to 17.3 ng/ml. Mean fasting serum betatrophin level in healthy subjects was 10.1 ng/ml. Two hours after meal, mean betatrophin level raised to 12.2 ng/ml while four hours after meal, it fell to 9.4 ng/ml. Both these changes in betatrophin levels were significant (p < 0.001).

Comparison of mean preprandial and postprandial serum betatrophin levels

Serum betatrophin in healthy, obese and obese after exercise training

Lipid profile in healthy, obese and obese after exercise training

References