

Controlled Exercise As A Tool For Preventing Obesity And Metabolic Diseases In Arg64 Carrier Women

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The β -3 adrenergic receptor affects mainly in the adipose tissue promoting lipolysis and fat mobilization, and the Trp64Arg (rs4994) polymorphism of the *ADRB3* gene has been associated with metabolic risk factors and obesity. **PURPOSE:** To analyze the effect of the Trp64Arg polymorphism of the *ADRB3* gene on the body weight and fat mass during a highly controlled exercise and diet program in overweight and obese healthy people. **METHODS:** 102 women (38.7 ± 8.1 years, 81.62 ± 11.45 kg) and 84 men (39.2 ± 7.9 years, 96.07 ± 10.89 kg) followed a 24-week weight loss intervention, including a controlled training program (supervised exercise group, S: 3 times/week, 38-60 min/session; strength, endurance and combined training; N=146) or exercise recommendations (non-supervised exercise group, NS; N=40) and a caloric restriction (30% of the total daily energy expenditure). Genotyping of the overweight subjects was done based on the PCR and RFLP techniques according to previously used protocols, and of the obese subjects using Real Time PCR. Repeated measurements ANOVA tests were used to determine differences between carriers and non-carriers in body weight and fat mass at the initial and final point. ANCOVA adjusted by initial weight was conducted to compare the changes of body weight and fat mass between carriers and non-carriers. The significant level was set at $\alpha=0.05$. **RESULTS:** The genotype distribution of the Trp64Arg polymorphism was 86.02%, 13.44% and 0.54% for the Trp64Trp, Trp64Arg and Arg64Arg respectively. The number of the Arg64 carriers was limited due to the healthy status inclusion criterion. In women no differences were found in weight or fat mass between the genetic groups before or after the intervention, not even in body weight change. However the Arg64 carriers in the S group lost more fat than the carriers in the NS group (5.59 ± 0.94 kg vs. -0.18 ± 2.48 kg, $p=0.03$). Moreover within the NS group the Arg64 carriers lost less fat than the non-carriers (5.60 ± 0.83 kg vs. -0.18 ± 2.48 kg, $p=0.03$). In men no statistically significant results were found. **CONCLUSION:** Our data suggest that controlled exercise, but not exercise recommendations, may be a key tool in the prevention of obesity and related metabolic diseases in women carrying the Arg64 allele, but not in men.

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