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The effect of the ACE, ACTN3 and PPARGC1A genes polymorphisms on high-intensity interval training of elite chinese rowers

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## INTRODUCTION:

To identify molecular genetic markers in ACE I/D rs1799752, ACTN3 R577X rs1815739 and PPARGC1A Gly482Ser rs8192678 that predict initial aerobic capacity and training sensitivity in rowing athletes to improve athletic performance in high-intensity interval training.

## **METHODS:**

Methods: Fifty four athletes 33 males and 21 females were selected from the national rowing group. The average age was 17.82±0.88 years, the average height was 180.46±8.04m, and the average weight was 77.53±12.48kg. Maximal oxygen uptake, functional conservation and 1000m/800m running were measured before and after a 4-week period of high-intensity interval training. DNA was extracted from saliva sample, genotype was identified by PCR-RFLP. A chi-square test was used to determine whether the SNPs met the Hardy-Weinberg equilibrium law. The association between genetic polymorphisms and the effects of high-intensity interval training was analysed by comparing aerobic phenotypes, training sensitivity between groups and pre- and post-training for each genotype.

**RESULTS:** 

1. In male athletes, the ACE I/D polymorphism was associated with the initial value of RE/VO2 as II genotype > DD genotype; 2. In female subjects, the rate of change of RE/VO2 was significantly higher in the ID genotype than in the DD genotype (P=0.045); 3, ACTN3 XX genotype and RX genotype VO2max change rate was significantly higher than RR genotype (P<0.05); ACE II genotype VO2max change rate was significantly higher than the DD genotype and ID genotype (P<0.05); 4. In male subjects, PPARGCIA polymorphism was associated with RE/VO2 In male subjects, PPARGC1A polymorphisms were associated with RE/VO2 initial values, showing GG genotype > GA genotype and AA genotype.

## CONCLUSION:

1. ACE I/D and PPARGC1A Gly482Ser can be used as genetic markers to predict the initial value of RE in males, and genotype II and GG carriers have RE higherly; 2. ACTN3 R577X can predict the effect of high-intensity interval training intervention for maximal oxygen uptake in females, and XX and RX are the dominant genotypes. Sex differences and genotypic characteristics should be taken into account for the effectiveness of exercise training in superior rowers.

Topic:

Molecular Biology and Biochemistry

Presentation

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