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|  | **Exercise Biochemistry Review** |
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**Proceedings of IBEC 2018, Beijing, China, October 23-25**

**PL-002**

**AGTR1 polymorphism is associated with elite endurance athletes: A functional study**

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**Objective** To explore the association between the polymorphism of angiotensin II receptor type 1 gene(AGTR1) and elite endurance athlete performance and the mechanism of how the polymorphism works.

**Methods** (1) Polymorphism of AGTR1 rs5182 between 122 elite Chinese endurance athletes and 222 controls were analyzed by MALDI-TOF-MS. (2) Aerobic capacity of 79 elite Chinese endurance athletes such as VC/FEV1/MVV/ VO2AT/ HRAT/ VAT/ VO2max/ HRmax/ VVO2max were measured and association between rs5182 polymorphism and the performance was analyzed. (3) PcDNA3.1-AGTR1 -T and pcDNA3.1-AGTR1-C plasmid were build and the plasmids was transfected into mammalian 293T cells. mRNA levels were detected after 48 hours. Statistical analysis was performed using SPSS software version 15.0. Values of P < 0.05 were considered statistically significant. Continuous data were expressed as mean ± SD, while categorical data were expressed as frequencies. Genotype distribution and allele frequencies between athletes and control subjects were compared using χ2 tests. Aerobic performance data was analyzed with One-Way ANOVA if it conformed to normal distribution and homogeneity of variance otherwise Non-parametric test of independent sample was used.

**Results** (1) Genotype frequencies of AGTR1 rs5182 are significant differences between the athletes and control subjects (p = 0.040), the Word-Class athletes and control subjects (p = 0.018), 5km athletes and control subjects (p =0.015), 10km athletes and control subjects (p = 0.026), male athletes and male controls(p=0.045). (2) Association is found between Genotype distribution and MV(L/min) though others not (Genotype: MV; CC: 122.514±6.767; CT:117.187±17.961; TT:119.688±20.226, p=0.047). (3) Transiently transfectedpcDNA3.1-AGTR1-T and pcDNA3.1-AGTR1-C plasmids into 293T cells successfully. The differences of mRNA levels between the groups were not significant (p = 0.991).

**Conclusions**  AGTR1 gene rs5182 could be a candidate genetic mark of selection elite endurance athletes in Han Population from Northern China, but this polymorphism does not affect AT1R protein function through changing its mRNA level.