



Associated analysis of single nucleotide polymorphisms found on exon 3 of the IGF-1 gene with Tibetan miniature pig growth traits

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ABSTRACT. The IGF-1 gene is an important regulating factor that has a growth-promoting effect on growth hormone. The IGF-1 gene promotes muscle cell differentiation in the muscle cell formation process. The IGF-1 gene also regulates the growth of skeletal muscle during skeletal muscle growth. In addition, the IGF-1 gene plays an important role in the formation of mammals and poultry embryos, and the process of postnatal growth. The IGF-1 gene has been implicated as a candidate gene for the regulation of pig growth traits. We analyzed exon 3 of the IGF-1 gene polymorphism in Tibetan miniature pigs (N = 128) by polymerase chain reaction-single-strand conformation polymorphism and DNA sequencing. One single nucleotide polymorphism (T40C) was found on exon 3 of the IGF-1 gene. Statistical analysis of genotype frequencies revealed that the T allele was dominant in Tibetan miniature pigs at the T40C locus. The association analysis showed that the IGF-1 mutation had an effect on the body weight, body length, and chest circumference

of pigs aged 6-8 months. In addition, the IGF-1 mutation had an effect on body weight in pigs aged 9-11 months ($P < 0.05$). We speculated that the pigs with the TT genotype grow more rapidly compared to those with the TC genotype. The TC genotype of the Tibetan miniature pig has a smaller body type. This information provides a theoretical basis for the genetic background of Tibetan miniature pigs.

Key words: Tibetan miniature pig; IGF-1 gene; SNP; Growth trait