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Genetic variations of the porcine PRKAG3 gene in Chinese indigenous pig breeds

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## **Abstract -**

Four missense substitutions (T30N, G52S, V199I and R200Q) in the porcine PRKAG3 gene were considered as the likely candidate loci affecting meat quality. In this study, the R200Q substitution was investigated in a sample of 62 individuals from Hampshire, Chinese Min and Erhualian pigs, and the genetic variations of T30N, G52S and V199I substitutions were detected in 1505 individuals from 21 Chinese indigenous breeds, 5 Western commercial pig breeds, and the wild pig. Allele 200R was fixed in Chinese Min and Erhualian pigs. Haplotypes II-QQ and IV-QQ were not observed in the Hampshire population, supporting the hypothesis that allele 200Q is tightly linked with allele 199V. Significant differences in allele frequencies of the three substitutions (T30N, G52S and V199I) between Chinese indigenous pigs and Western commercial pigs were observed. Obvious high frequencies of the "favorable" alleles 30T and 52G in terms of meat quality were detected in Chinese indigenous pigs, which are well known for high meat quality. However, the frequency of the "favorable" allele 199I, which was reported to have a greater effect on meat quality in comparison with 30T and 52G, was very low in all of the Chinese indigenous pigs except for the Min pig. The reasons accounting for this discrepancy remain to be addressed. The presence of the three substitutions in purebred Chinese Tibetan pigs indicates that the three substitutions were ancestral mutations. A novel A/G substitution at position 51 in exon 1 was identified. The results suggest that further studies are required to investigate the associations of these substitutions in the PRKAG3 gene with meat quality of Chinese indigenous pigs, and to uncover other polymorphisms in the PRKAG3 gene with potential effects on meat quality in Chinese indigenous pigs.

## **Key words**

: pig, PRKAG3 gene, meat quality

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