



Lack of an association between a single nucleotide polymorphism in the bovine myogenic determination 1 (MyoD1) gene and meat quality traits in indigenous Chinese cattle breeds

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ABSTRACT. The myogenic determination 1 (MyoD1) gene is a member of the MyoD gene family. It encodes for skeletal muscle-specific transcription factors containing highly conserved basic helix-loop-helix regions that perform important roles in the initiation, maintenance, and regulation of phenotypic traits. We investigated a new single nucleotide polymorphism (SNP) in the MyoD1 gene to evaluate whether this polymorphism affects meat quality traits in five Chinese indigenous cattle breeds, namely Qinchuan (QC), Xia-Nan (XN), Nan-yang (NY), Luxi (LX), and Jia-xian red (JXR). A C→G transversion at position 624 was detected in exon 1 of the MyoD1 gene; it causes an amino acid substitution (⁶²⁴serine/⁶²⁴cysteine). Least squares analysis showed that this SNP is not significantly associated with back

fat thickness, eye muscle area, intramuscular fat, or marbling. The A/B allelic frequencies in the five breeds were 0.810/0.189, 0.779/0.220, 0.768/0.231, 0.820/0.180, and 0.801/0.198, respectively. Based on the χ^2 test, the genotype distributions of four cattle breeds (LX, NY, QC, and XN) did not agree with Hardy-Weinberg equilibrium ($P < 0.05$); one breed (JXR) did not deviate significantly from Hardy-Weinberg equilibrium ($P > 0.05$). The genotypic frequencies among all five cattle breeds showed moderate diversity ($0.25 < \text{polymorphism information content} < 0.5$). We concluded that the C624G SNP of the MyoD1 gene does not influence meat quality traits in indigenous Chinese cattle breeds; however, this SNP could be included in breed composition and population admixture analyses due to the marked differences in allelic frequencies among these five breeds.

Key words: Allelic frequencies; Myogenic determination gene 1; Meat quality; Single nucleotide polymorphism; Qinchuan cattle