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Impacts of single nucleotide polymorphisms and haplotypes in the bovine *Dapper1* gene on body weight

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ABSTRACT. The Dapper1 protein plays important role in multiple developmental processes via negative modulation of the Wnt signaling pathway. We detected variations in *Dapper1* in 1185 individuals from 5 Chinese cattle breeds and determined their effects on bovine body weight. Two silent mutations (g.8344C>T and g.8428C>T) in exon 6 along with two substitutions (g.10513A>G and g.10765C>G) in the 3'-untranslated region were detected with DNA pool sequencing and forced polymerase chain reaction-restriction fragment length polymorphism. Haplotype variability and the extent of linkage disequilibrium of the 4 single nucleotide polymorphisms (SNPs) were analyzed, and the results revealed 16 haplotypes and 7 combined haplotypes in the 5 cattle breeds. Statistical analyses indicated that genotypes CC and AA in the g.8344C>T and g.10513A>G loci were associated with heavier body

weight at 6 months in the Nanyang cattle population ($P < 0.05$), and the combined haplotype had consistent significant effects on body weight with a single SNP. Cattle with haplotype combinations H1H5 (CCCTAACC) displayed the heaviest body weight at 6 months compared with that of other haplotypes ($P < 0.05$). Our results provide evidence that 4 SNPs and haplotypes in *Dapper1* may be used for marker-assisted selection in beef cattle breeding programs.

Key words: Cattle; *Dapper1* gene; SNPs; Haplotype; F-PCR-RFLP; Body weight

