



Novel SNPs of the mannan-binding lectin 2 gene and their association with production traits in Chinese Holsteins

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ABSTRACT. The mannan-binding lectin gene (*MBL*) participates as an opsonin in the innate immune system of mammals, and single nucleotide polymorphisms (SNPs) in *MBL* cause various immune dysfunctions. In this study, we detected SNPs in *MBL2* at exon 1 using polymerase chain reaction single-strand conformation polymorphism analysis and DNA sequencing techniques in 825 Chinese Holstein cows. Four new SNPs with various allele frequencies were also found. The g.1164 G>A SNP was predicted to substitute arginine with glutamine at the N-terminus of the cysteine-rich domain. In the collagen-like domain, SNPs g.1197 C>A and g.1198 G>A changed proline to glutamine, whereas SNP g.1207 T>C was identified as a synonymous mutation. Correlation analysis showed that the g.1197 C>A marker was significantly correlated to somatic cell score (SCS), and the g.1164 G>A locus had significant effects on SCS, fat content, and protein content ($P < 0.05$), suggesting possible roles of these SNPs in the host response against mastitis. Nine haplotypes and nine

haplotype pairs corresponding to the loci of the 4 novel SNPs were found in Chinese Holsteins. Haplotype pairs MM, MN, and BQ were correlated with the lowest SCS; MN with the highest protein yield; MM with the highest protein rate, and MN with the highest 305-day milk yield. Thus, MM, MN, and BQ are possible candidates for marker-assisted selection in dairy cattle breeding programs.

Key words: Bovine; *MBL2*; SNPs; Somatic cell score