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ABSTRACT

Investigation of Coat Color Candidate Genes in Korean Cattle(Hanwoo)

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Most cattle breeds have a coat color pattern that is characteristic for the breed. Korean cattle(Hanwoo) has a coat color ranging from yellowish brown to dark brown including a red coat color. Variation in the Hanwoo coat color is likely to be the effects of modified genes segregating within the Hanwoo breed. MC1R encoded by the Extension (E) locus was almost fixed with recessive red e allele in the Hanwoo, but other gene(s) might be affecting the variation of the Hanwoo coat color into yellowish to red brown. We have analyzed a segregation of coat color in the F2 families generated from two Hanwoo bulls(yellowish brown) mated to six F1 dams(black) derived from Hanwoo and Holstein crosses. Segregation of coat color in the offspring found a ratio of 1(yellowish brown) : 1 (black) and this ratio indicates that a single gene may play a major role for the Hanwoo coat color. We further investigated SNPs in MC1R, ASIP and TYRP1 loci to determine genetic cause of the Hanwoo coat color. Several polymorphisms within ASIP intron 2 and TYRP1 exons were found but not conserved within the Hanwoo population. However, the segregation of the MC1R e allele was completely associated with the Hanwoo coat color. Based on this information, it is clear that the MC1R e allele is mainly responsible for the yellowish red Hanwoo coat color. Further study is warrant to identify possible genetic interaction between MC1R e allele and other coat color related gene(s) for the variation of Hanwoo coat color from yellowish brown to dark brown. (Key words : Hanwoo, Coat color, SNP, MC1R, ASIP, TYRP1)

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