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ABSTRACT

Association of a single nucleotide polymorphism in *akirin 2* gene with marbling in Japanese Black beef cattle

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BACKGROUND: Marbling defined by the amount and distribution of intramuscular fat, so-called *Shimofuri*, is an economically important trait of beef cattle in Japan. The c17-25 expressed sequence tag (EST) has been previously shown to possess expression difference in *musculus longissimus* muscle between low-marbled and high-marbled steer groups, and to be located within genomic region of a quantitative trait locus for marbling. Thus, the *akirin 2 (AKIRIN2)* gene containing the c17-25 EST sequence was considered as a positional functional candidate for the gene responsible for marbling. In this study, we explored single nucleotide polymorphism (SNP) in the *AKIRIN2* and analyzed association of the SNP with marbling.

FINDINGS: A SNP in the 3' untranslated region of the *AKIRIN2*, referred to as *c.*188G>A*, was the only difference detected between high- and low-marbled steer groups. The SNP was associated with marbling in 3 experiments using 100 sires (P = 0.041), 753 paternal half-sib progeny steers from 4 sires heterozygous for the *c.*188G>A* (P = 0.005), and 730 paternal half-sib progeny steers from 3 sires homozygous for the *A* allele at the *c.*188G>A* (P = 0.047), in Japanese Black beef cattle. The effect of genotypes of the SNP on subcutaneous fat thickness was not statistically significant (P > 0.05).

CONCLUSION: These findings suggest that the *AKIRIN2* SNP polymorphism is associated with marbling and may be useful for effective marker-assisted selection to increase the levels of marbling in Japanese Black beef cattle.

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