Identification of complete linkage disequilibrium in the DSG4 gene and its association with wool length and crimp in Chinese indigenous sheep

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ABSTRACT. The desmoglein 4 (DSG4) gene is a potential candidate in the search for genes that may affect wool traits, because of its function. This study aimed to screen for polymorphisms in partial exon 16 and 3'UTR of the sheep desmoglein 4 (DSG4) gene, and to test its possible association with wool length and crimp associated with fur. Overall, 326 sheep were scanned via single-strand conformational polymorphism assay, through three pairs of primers. The breeds included Tan, Han, and TanxHan from China, Polled Dorset from Australia, and Suffolk from Britain genotypes AA, BB, and AB for primer2 and genotypes DD, EE, and DE for primer3 were detected in native breeds. Six SNPs
and 3-bp insertion/deletions were found in exon 16, of which 4 lead to amino acid substitutions. In addition, 1 SNP was found in 3'UTR. The DSG4 genotype was found to be strongly associated with all wool traits that were considered in this study (P < 0.01). Sheep with the genotype MM had a higher least square mean compared to sheep with the genotype WW or WM with respect to birth scapular wool length (P < 0.01), crimp number of birth scapular wool crimp (P < 0.01), crimp number of weaning scapular wool crimp (P < 0.01), and crimp number of weaning rump wool crimp (P < 0.01, P < 0.05). In conclusion, our study is the first to demonstrate that the DSG4 gene may be a candidate, or major gene, which influences important wool traits.

**Key words:** Sheep; DSG4 gene; Polymorphisms; Wool length; Wool crimp; Complete linkage disequilibrium