



Novel single nucleotide polymorphisms in the 5' regulatory region of the duck *SCD1* gene and their associations with serum biochemical levels and fatty acid composition

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ABSTRACT. Stearoyl-coenzyme A desaturase 1 (SCD1) is the key limiting enzyme in the synthesis of monounsaturated fatty acids, and plays a crucial role in the regulation of oleic acid. In this study, 165 ten-week-old Cherry Valley ducks were used to investigate single nucleotide polymorphisms (SNPs) in the 5' regulatory region of the *SCD1* gene, and their associations with duck serum biochemical levels and fatty acid composition. Two novel SNPs, g.936516 C > G and g.936551 T > C, were found by polymerase chain reaction-single-strand conformation polymorphism analysis and DNA sequencing methods, exhibiting six genotypes (AA, BB, CC, AB, AC, and BC). The frequency of the dominant genotype BB and allele B was 0.321

and 0.403, respectively. The polymorphism information content value was 0.617, indicating high polymorphism. The chi-square test indicated that the genotype distribution deviated markedly from Hardy-Weinberg equilibrium ($P < 0.01$). The linkage of the two mutant sites in the duck *SCD1* gene had significant effects on the serum albumin, total protein, globulin, triglyceride, total cholesterol, and cholinesterase levels, as well as on 16 kinds of fatty acids except for C14:1 and C20:0 ($P < 0.05$). These results indicated that the C allele might have a positive effect on polyunsaturated fatty acids with potential health benefits. Therefore, the *SCD1*-gene-specific SNPs in the 5' regulatory region may be a useful marker for serum lipid, serum protein, and fatty acid composition in future marker-assisted selection for duck breeding.

Key words: Duck; SCD1; SNPs; Serum biochemical levels; Fatty acid composition