Transcriptional co-activator PGC-1α gene is associated with chicken skeletal muscle fiber types


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ABSTRACT. The peroxisome proliferators-activated receptor-γ coactivator-1α (PGC-1α) is a candidate gene for meat quality traits because of its prominent role in muscle fiber type switching and determination. We investigated the effects of the PGC-1α gene on chicken skeletal muscle fiber type switching and on other meat quality traits. Single nucleotide polymorphisms were detected by PCR-SSCP and DNA sequencing, and then genotyping was performed by PCR-ligation detection reaction methods. Skeletal muscle fiber types, intramuscular fat content, shear forces, and water loss rate of the gastrocnemius lateralis muscle were measured in Qingyuan Partridge chickens and Recessive White chickens. Four SNPs, C171T in exon2, C384T in exon3, G646A in exon5, and A948G in exon8 were detected. Marker-trait association analysis indicated that G646A polymorphism was associated with skeletal myofiber type and that H1 (CCAA) was the most advantageous haplotype for skeletal myofiber
type. We concluded that polymorphisms of the PGC-1α gene and their haplotypes are associated with chicken skeletal myofiber type traits.

**Key words:** PGC-1α gene; Ligase detection reaction; Polymorphism; Myofiber type; Chicken; SNPs