



# Genetic effect of an A/G polymorphism in the *HSP70* gene on thermotolerance in chicken

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Genet. Mol. Res. 15 (2): [gmr.15028271](http://dx.doi.org/10.4238/gmr.15028271)

Received August 8, 2015

Accepted November 26, 2015

Published July 15, 2016

DOI <http://dx.doi.org/10.4238/gmr.15028271>

**ABSTRACT.** Studying thermotolerance is important for the prevention of thermostress in chickens. This study aimed to analyze the effect of mutations in the heat shock protein 70 (*HSP70*) gene on chicken thermotolerance. The C.-69A>G SNP in the 5'-flanking region of the *HSP70* gene was genotyped in Lingshan and White Recessive Rock (WRR) chickens. Association of this SNP with thermotolerance traits revealed it to be significantly associated with CD4<sup>+</sup>/CD8<sup>+</sup>, and potentially associated with heterophil-to-lymphocyte ratio in WRR chickens exposed to thermoneutral temperature (15°C). Online prediction detected a putative myeloid zinc finger protein 1 binding factor in the C.-69A>G mutation. Under acute thermostress, mRNA levels of *HSP70* in individuals with different C.-69A>G genotypes varied in the heart, leg muscle, and liver tissues. The *HSP70* protein was expressed at higher levels in individuals with the GG genotype than in those with the AA genotype. In heart and liver, protein expression of *HSP70* in individuals with the GG genotype was significantly higher than in those with the AA genotype. In leg muscle, protein expression

was higher in birds with the GG genotype than in those with the AA and AG genotypes. Luciferase activity of the GG genotype was significantly higher than that of the AA genotype, suggesting that the C.-69A>G SNP regulates *HSP70* gene expression. These results indicate that the C.-69A>G SNP in the 5'-flanking region of the *HSP70* gene might affect chicken thermotolerance and that the GG genotype might be advantageous for the prevention of thermostress.

**Key words:** Chicken *HSP70* gene; Thermotolerance traits; mRNA expression; Western blotting; Dual-luciferase reporter assay