



Detection of differentially expressed genes in the longissimus dorsi of Northeastern Indigenous and Large White pigs

Y. Gao^{1*}, Y.H. Zhang^{2*}, H. Jiang¹, S.Q. Xiao³, S. Wang¹, Q. Ma², G.J. Sun¹, F.J. Li¹, Q. Deng¹, L.S. Dai¹, Z.H. Zhao², X.S. Cui¹, S.M. Zhang⁴, D.F. Liu¹ and J.B. Zhang¹

¹Laboratory Animal Center, Jilin University, Changchun, Jilin, China

²College of Animal Science and Veterinary Medicine, Jilin University, Changchun, Jilin, China

³School of Life Science, Sun Yat-sen University, Guangzhou, Guangdong, China

⁴Branch of Animal Husbandry, Jilin Academy of Agricultural Science, Gongzhuling, Jilin, China

*These authors contributed equally to this study.

Corresponding author: J.B. Zhang

E-mail: zjb515@163.com

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ABSTRACT. Recent attention in pig breeding programs has focused on the improvement of pork quality in response to increasing consumer demands. Compared to the fatty-type Northeastern Indigenous (Chinese) breed of pigs, the lean-type Large White has lower intramuscular fat and inferior eating quality from the perspective of the Chinese consumer. In order to investigate the molecular basis of differences in pork quality in Chinese indigenous and Western breeds, longissimus dorsi samples were collected from three adult Northeastern Indigenous and three adult Large White pigs. The RNAs were extracted and hybridized to the porcine Affymetrix GeneChip. Microarray analysis demonstrated differential expression of 1134 genes of which 401 have a known

function. One hundred and thirty-six genes were up-regulated and 998 down-regulated in Northeastern Indigenous breed compared to Large White pigs. We screened 10 genes as candidate genes associated with pork quality. We investigated a single nucleotide polymorphism in the 5' regulatory region of the gene FABP4 in 65 Songliao black swine, using PCR-single-strand conformational polymorphism. We found this polymorphism to be highly significantly associated with marbling and intra-muscular fat content ($P \leq 0.01$). Genotype BB had higher marbling than AB and AA, but there was no significant difference between AB and AA. Genotype BB and AB had higher intra-muscular fat content than AA, but there was no significant difference between BB and AB. These results help to elucidate the genetic mechanisms behind differences in pork quality and provide a theoretical basis for selection and genetic improvement of meat quality traits in pigs.

Key words: Adipocyte fatty acid-binding protein; Gene expression; Longissimus dorsi; Meat quality; Pigs; Polymorphism