Identification and characterization of
*RFRP* gene in pigs and its association with reproductive traits

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**ABSTRACT.** RFamide-related peptide (*RFRP*) gene is a crucial gene of the hypothalamo-pituitary-gonadal axis and plays an important role in reproduction regulation. This study aimed to clone and characterize the pig *RFRP* gene. We obtained a 645-bp cDNA of pig *RFRP* gene comprising a 546-bp open reading frame, which encoded a peptide of 188 amino acids. The pig RFRP coding sequences have the identities of 81, 68.8, and 76.1% with their counterparts in humans, mice, and rats, respectively. Real-time polymerase chain reaction showed that the pig *RFRP* gene was expressed predominantly in the stomach and testis of males, and large intestine and uterus of females. It was also found
to be abundantly expressed in the cerebrum and liver tissues of both male and female pigs. The pig RFRP gene is 4.6 kb long and contains 3 exons and 2 introns. We further identified a total of 25 single nucleotide polymorphisms and 2 insertion/deletion (indel) polymorphisms across the whole RFRP gene, and 9 of them were in the exons. Marker trait association analysis in Yorkshire and Landrace populations showed that g.45859759C>T was significantly associated with the total number born of second parity (TBA2; P < 0.05). In conclusion, the pig RFRP gene was cloned and characterized in this study, and its polymorphism g.45859759C>T showed significant associations with reproductive traits.

Key words: Pig; RFRP gene; SNP; Reproductive trait; Association analysis