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Localization, Expression Change in PRRSV Infection and Association Analysis of the Porcine TAP1 Gene

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Abstarc :

The transporter associated with antigen processing (TAP) translocates antigenic peptides from the cytosol into the lumen of the endoplasmic reticular and plays a critical role in the major histocompatibility complex (MHC) class I molecule-mediated antigenic presentation pathway. In this study, the porcine *TAP1* gene was mapped to the pig chromosome 7 (SSC7) and was closely linked to the marker SSC2B02 (retention fraction=43%, LOD=15.18). Subcellular localization of TAP1 by transient transfection of PK15 cells indicated that the TAP1 protein might be located in the endoplasmic reticulum (ER) in pig kidney epithelial cells (PK-15). Gene expression analysis by semi-quantitative RT-PCR revealed that *TAP1* was selectively expressed in some immune and immune-related tissues. Quantitative real-time PCR (qRT-PCR) analysis revealed that this gene was up-regulated after treatments that mimic viral and bacterial infection (polyriboinosinic-polyribocytidylic acid (poly(I:C)) and lipopolysaccharide (LPS), respectively). In addition, elevated *TAP1* expression was detected after porcine reproductive and respiratory syndrome virus (PRRSV) infection in porcine white blood cells (WBCs). One single nucleotide polymorphism (SNP) in exon 3 of *TAP1* was detected in a Landrace pig population by *Bsp143*I restriction enzyme digestion. Different genotypes of this SNP had significant associations ($P<0.05$) with the red blood cell distribution width (RDW) of 1-day-old (1 d) pigs ($P=0.0168$), the PRRSV antibody level (PRRSV Ab) ($P=0.0445$) and the absolute lymphocyte count (LYM#) ($P=0.024$) of 17 d pigs. Our results showed that the *TAP1* gene might have important roles in swine immune responses, and these results provide useful information for further functional studies.

Key Word :
Pig, TAP1, Localization, Expression, PRRSV, Association analyses

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