



## Mapping, expression and regulation of the TR $\alpha$ gene in porcine adipose tissue

Z.-W. Cai, Y.-F. Sheng, L.-F. Zhang, Y. Wang, X.-L. Jiang,  
Z.-Z. Lv and N.-Y. Xu

College of Animal Science, Zhejiang University, Hang Zhou, P.R. China

Corresponding author: N.-Y. Xu  
E-mail: nyxu@zju.edu.cn

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**ABSTRACT.** Thyroid hormone receptors (TR) are members of the nuclear receptor superfamily. There are at least two TR isoforms, TR $\alpha$  and TR $\beta$ . The TR $\alpha$  isoform plays a critical role in mediating the action of thyroid hormone in adipose tissue. We mapped the porcine TR $\alpha$  gene to chromosome 12 p11-p13, by using the ImprRH panel. We examined tissue-localization of TR $\alpha$  and determined expression patterns of TR $\alpha$  in porcine adipose tissue with quantitative real-time PCR. TR $\alpha$  was expressed in all tissues, including heart, liver, spleen, stomach, pancreas, brain, small intestine, skeletal muscle, and subcutaneous adipose tissue. In the adipose tissue, the expression of TR $\alpha$  decreased postnatally. Compared to Yorkshire pigs, Jinhua pigs had significantly lower expression levels of TR $\alpha$  gene in the subcutaneous fat tissue. The expression levels of  $\beta$ 2-AR, HSL and ATGL were also significantly lower in Jinhua pigs than in Yorkshire pigs. However, no significant differences in PPAR $\gamma$  and SREBP-1C expression levels were found between Jinhua and Yorkshire pigs. Incubation of porcine adipose tissue explants with high doses of isoproterenol (100 and 1000 nM) significantly increased

the expression levels of TR $\alpha$ . We conclude that there is considerable evidence that TR $\alpha$  plays an important role in fat deposition in porcine adipose tissue.

**Key words:** Thyroid hormone; TR $\alpha$ ; Adipose tissue; Fat deposition