



GENE EXPRESSION OF *PPARGC1A* AND SEVERAL DOWNSTREAM TARGET GENES IN PORCINE BACKFAT AND *LONGISSIMUS DORSI* MUSCLE

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INTRODUCTION

Peroxisome proliferator-activated receptor γ coactivator 1 α (*PPARGC1A*) is a versatile coactivator and is of vital importance to energy and fat metabolism. Based on these functions, it not only is an excellent candidate gene for meat quality in pigs, but also is of great interest for human research. The information on the *in vivo* gene expression and relationship between *PPARGC1A* and its downstream target genes is however very limited, especially in the pig.

EXPERIMENT

In this study, the gene expression pattern of *PPARGC1A* and 10 of its putative target genes was determined in backfat and 2 *longissimus dorsi* muscle samples (MLD1 and 2) from each of 20 pigs, by a real-time PCR. The experimental setup as shown in Figure 1 included a minus RT control, an RNA quality check on an agarose gel, and an RNA concentration and purity measurement. Evaluation of reference gene expression stability by geNorm indicated that normalisation with *ACTB*, *TBP* and *TOP2B* provided reliable mRNA expression results (Figure 2).



Figure 1. Experimental setup.

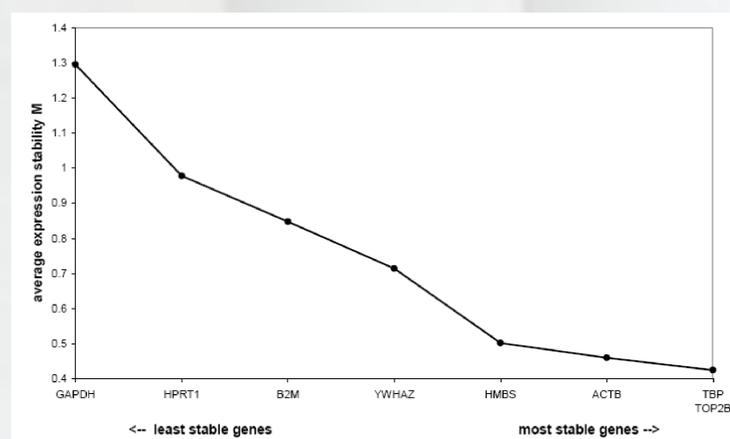


Figure 2. Evaluation of the mRNA expression stability of the reference genes by geNorm.

RESULTS & DISCUSSION

The data provide evidence for a significant mRNA expression difference between backfat and MLD (Figure 3), and statistical analysis indicated that there was a strong genetic regulation of the mRNA expression of several target genes. As shown in Figure 4, a significant correlation was found between *PPARGC1A* and most of the genes under investigation. Combined with literature data, the results suggest a clear impact of *PPARGC1A* on energy and lipid metabolism *in vivo* in the pig through several of these downstream target genes.

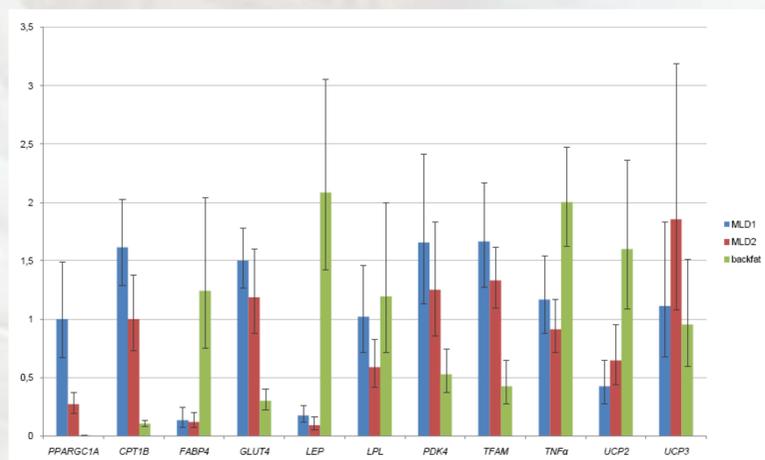


Figure 3. Relative mRNA expression patterns of *PPARGC1A* and its downstream target genes in the 3 sampling groups. Linear mRNA expression values from all genes are rescaled against the value of MLD1 from *PPARGC1A*. Bars represent the 95% confidence interval.

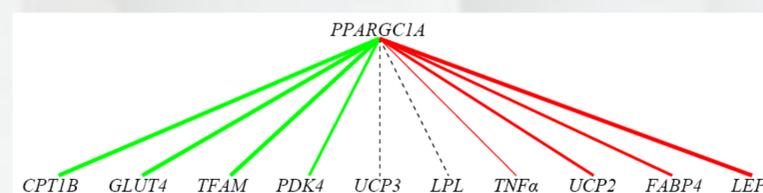


Figure 4. Correlations found between *PPARGC1A* and its downstream target genes. A positive correlation with *PPARGC1A* gene expression was found for *CPT1B*, *GLUT4*, *PDK4* and *TFAM*. A negative correlation was found for *UCP2*, *FABP4*, *LEP* and *TNF α* . No significant correlation was detected for *UCP3* and *LPL*. Green line: significant, positive correlation; red line: significant, negative correlation; dashed line: no correlation.