

TOMIKO FUMITA¹, TETSUJI ETOH¹, KEIKO TANAKA¹, JOCHEN WEGNER², TAKAFUMI GOTOH¹

¹Kuju Agricultural Research Center, Kuju 4045-1, Kuju town, Naoiri-gun Oita Pref. Japan

²Research Institute for the Biology of Farm Animals, Wilhelm-Stahl-Allee2, 18196 Dummerstorf, Germany

Influence of Feed Quality on the Expression of PPAR_γ2 in Skeletal Muscles on Calves

Peroxisome proliferator-activated receptor gamma2 (PPAR_γ2) is one of the nuclear receptors and it is known to be a main regulator of adipogenesis. Although PPAR_γ2 mRNA is expressed at early stages in the course of adipocyte differentiation *in vitro*, no study has examined the influences of nutritional differences in the early periods of growth on the expression of PPAR_γ2 mRNA in skeletal muscles in cattle. The purpose of this experiment was to investigate the influence of feed quality on the expression of PPAR_γ2 mRNA in skeletal muscles of calves.

Nine Holstein and six Japanese Black calves were used. All trial calves were nursed artificially until they were 2 months of age. They were divided into two groups at 2 months of age: groups R and C. In group R, the calves were fed only roughage. In group C, they were fed a considerable amount of concentrate (over 2.5% of their body weight) and given *ad libitum* access to Italian ryegrass hay (roughage). Muscle samples were taken by biopsy from *M. longissimus thoracis* (LT) and *M. biceps femoris* (BF) at 2 and 5 months of age in Holstein and at 5 months of age in Japanese Black calves. Total RNA was isolated from these tissues with ISOGEN. Semi-quantitative analysis of reverse transcription-polymerase chain reaction (RT-PCR) was used to measure the expression of PPAR_γ2 mRNA. For amplification of PPAR_γ2 the following primer pair was used: forward 5'-GTG GTG GCA AAT CCC TGT TC-3' and reverse 5'-CGG AAG AAA CCC TTG CAT CC-3'. The ribosomal protein L7 was used as a standard for each PCR reaction.

There were some significant differences of the expression of PPAR_γ2 mRNA between groups, ages, and muscles in Holstein. At 5 months of age in LT, the expression of PPAR_γ2 mRNA in group C was significantly higher than in group R. In group C, the expression of PPAR_γ2 in LT was significantly higher at 5 months than at 2 months of age. In group C, the expression of PPAR_γ2 was observed to be significantly higher in LT than in BF. At 5 months of age, no significant differences were observed between both muscles of Holstein and Japanese Black calves. This suggests that the level of adipocyte differentiation in skeletal muscles is not significantly different between the two breeds at 5 months of age.

In this experiment, feed quality influenced the expression of PPAR_γ2 in skeletal muscles during 2-5 months. These data suggest that feed quality might influence adipocyte differentiation in bovine skeletal muscles during the early growth period.

Corresponding Author:

Fumita Tomiko, Kuju agricultural research center, Kuju 4045-1, Kuju town, Naoiri-gun, Oita Pref. Japan, 878-0201