



## ***C/EBP $\alpha$* gene as a genetic marker for beef quality improvement**

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**ABSTRACT.** Intramuscular fat (IMF) or intramuscular triglycerides are interspersed throughout the skeletal muscles. The IMF, also called marbling, imparts meat with flavor and juiciness and is one of the core criteria for judging carcass value. The quantity of IMF is influenced entirely by genetics. Recently, understanding the underlying genetic bases of IMF has been a focus particularly in the beef industry. In this study, with the deep insights of ameliorating the beef quality by genetic means, the role of the CCAAT/enhancer binding protein alpha (*C/EBP $\alpha$* ) gene was investigated by over-expressing *C/EBP $\alpha$*  in bovine muscle stem cells (MSCs) to initiate the adipogenic program. Prior to this, bovine MSCs were isolated and induced to differentiate into adipocytes from cells that were exposed to dexamethasone isobutylmethylxanthine and indomethacin; the presence of insulin and fetal bovine serum was examined. Either ectopic expression of *C/EBP $\alpha$*  or treatment with dexamethasone and insulin induced the accumulation of fat droplets and the expression of adipogenic induction genes (*LPL*, *PPAR $\gamma$* , *C/EBP $\beta$* , and *C/EBP $\delta$* ). The expression levels of myoblast-related genes (*MyoD*, *Myf5*, and *Pax7*) were also measured to assess the accuracy of the

differentiation process. This study provides evidence that the *C/EBP $\alpha$*  gene is essential for cattle adipose tissue growth and development. Hence, this finding can contribute to improving beef carcass quality.

**Key words:** *C/EBP $\alpha$*  gene; Bovine muscle stem cells; Over-expression; Adipocyte differentiation