

The effects of conjugated linoleic acid isomers on the morphological changes in adipose tissue and adipogenic genes expressions on primary adipose tissue

ABSTRACT

Previous studies carried out in mouse 3T3-L1 cell culture have shown that conjugated linoleic acid (CLA) inhibited adipocyte differentiation. The present study was undertaken to investigate the effect of cis-9, trans-11 and trans-10, cis-12 CLA isomers on morphological changes and on mRNA expressions in the in vitro adipocyte isolated from specific pathogen-free (SPF) chicken. The adipocytes were isolated from SPF chicken and cultured in differentiation-induction medium with different concentrations of cis-9, trans-11 and trans-10, cis-12 CLA. After day 7, the adipocyte differentiations were monitored morphologically and mRNA expressions of lipoprotein lipase (LPL) and acyl-coenzyme A binding domain containing 5 (ACBD 5) were quantified by real-time polymerase chain reaction (PCR) analysis. Our data suggested that cis-9, trans-11 CLA downregulated the expression of LPL and ACBD 5 genes, which was concurrently observed with decrease in the adipocyte area size and cell number compared to the control and trans-10, cis-12 treated groups. Based on this finding, we concluded that dietary CLA modulate fat reduction in chicken via alteration of transcription of key adipogenic genes and adipose cellularity.

Keyword: Adipocytes; Chicken; Conjugated linoleic acid; Gene expression; Fatty acids