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## The Effects of Conjugated Linoleic Acid(CLA) and Conjugated Nonadecadienoic Acid(CNA) on Expressions of Desaturase Genes during Adipocyte Differentiation of 3T3-L1 Cells

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It is known that CLA and CNA decrease fat deposition in mammals. However, the underlying molecular mechanism for their anti-obesity action is not well understood. Since overall MUFA levels were significantly lower in the epididymal fat pad of animals fed with CLA groups in our previous study, 5 different desaturases among various genes associated with fatty acid metabolism were examined to address whether CLA and CNA supplements influence their transcriptions using a well-established 3T3-L1 preadipocyte differentiation culture. Isomers of CLAs at 50μM (cis-9, trans-11) or (trans-10, cis-12), CLA, 20uM CNA and 20μM linoleic acid as a control were added respectively into 3T3-L1 preadipocyte differentiation medium. Cell samples were collected at 3-day intervals up to 12days. Cytochemical analyses for lipid accumulation, cell proliferation and cell death were carried out to compare cellular activity. RT-PCR analyses of D5d, Fads1, Fads3, Scd1, Scd3 and GAPDH were also used to find any modulatory effects of the supplements on the desaturase gene expressions. The results demonstrated that lipid accumulation indicated by Oil Red-O staining was not significantly different among the experimental groups. BrdU incorporation also showed a slight decrease in CLA isomer- or CNA-treated cells. Cell death analyzed by pyknotic nuclei also increased slightly in the groups of the supplements. While GAPDH expression was not influenced markedly, the expressions of D5d, Fads1, Fads3, Scd1 and Scd3 genes were differentially affected. Fads1 and Scd1 transcripts increased at days 6 and 9 in the CLA isomers and CNA groups, but Fads3 and Scd3 showed neither differences nor increases in the same groups. Meanwhile, D5d expression was not affected as compared with those of control or LA groups. These specific selection of desaturases under the CLA isomers or CNA supplements suggest that the supplements modulate lipid metabolism by using different metabolic pathways of desaturation in fatty acids. The modulation of various desaturase gene expressions by CLA isomers and CNA may reflect one of the complex aspects in their anti-obesity action.