

# Metabolism of conjugated fatty acids (CLA and CLnA) in human colon cell lines with different stage of transformation: Challenges and chances

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Experimental models have contributed to an improved understanding of the genesis and the possibilities of intervention in diet-related diseases such as coronary heart disease, diabetes, and cancer. Several studies have confirmed various health benefits of CFAs (conjugated fatty acids) like conjugated linoleic acids (CLAs) and conjugated linolenic acids (CLnAs). This investigation focuses on the incorporation and metabolism of CFA isomers in the adenomatous cell line LT-97 in comparison to the well-established colon adenocarcinoma cell line HT-29. The incorporation and metabolism of CFA with *cis/trans* and *all-trans* double bonds was compared to the best studied CLA isomer (*c9,t11*). Basal gene expression of desaturases ( $\Delta 5$ ,  $\Delta 6$  and  $\Delta 9$ ) and elongases (1, 2, 5 and 6) was determined in LT-97 and HT-29 using PCR techniques. LT-97 cells revealed no basal expression of elongase 2. HT-29 cells revealed no basal expression of desaturases ( $\Delta 5$  and  $\Delta 6$ ) and elongases (2 and 5). Analysis of cellular fatty acids revealed a 2-fold higher incorporation of CFA like *c9,t11*-CLA (40  $\mu$ M and 80  $\mu$ M) in lipids of HT-29 cells compared to LT-97 cells. Albeit, both cell lines differ considerably regarding culture and growth specificities. LT-97 cells showed more versatility and a greater capacity to metabolize *c9,t11*-CLA. Whilst the ratio of  $\beta$ -oxidized elongated conjugated dienoic (CD) showed an 8-fold difference between the cell lines (CD-C16:2/CD-C20:2; HT-29: 8:1; LT-97: 1:1), cellular lipids showed an equal percentage composition. Notably, the conversion of CLnA to CLA (*c9,t11,t13*-CLA to *c9,t11*-CLA) and an inter-conversion of a CLA isomer (*t11,t13*-CLA to *c9,t11*-CLA) was shown in both cell lines. Although, LT-97 cells incorporated lower amounts of CFA, the cell culture might represent physiologic conditions to a better extent compared to HT-29 cells due to a more balanced FA metabolism. The results indicate that LT-97 cells represent a superior model to carry out elongation and desaturation studies of unsaturated and conjugated fatty acids compared to HT-29 cells.