Isomers of conjugated linoleic acids (CLA) reduce fat mass (FM) and increase insulin sensitivity in some, but not all, murine studies. In humans, this effect is still debatable. In this study, we compared the effect of 2 CLA supplements on total and regional FM assessed by dual energy X-ray absorptiometry, changes in serum insulin and glucose concentrations, and adipose tissue (AT) gene expression in humans. In a double-blind, parallel, 16-wk intervention, we randomized 81 healthy postmenopausal women to 1) 5.5 g/d of 40/40% of cis9, trans11-CLA (c9, t11-CLA) and trans10, cis12-CLA (t10, c12-CLA) (CLA-mix); 2) cis9, trans11-CLA (c9, t11-CLA); or 3) control (olive oil). We assessed all variables before and after the intervention. The CLA-mix group had less total FM (4%) and lower-body FM (7%) than the control (P = 0.02 and <0.001, respectively). Post hoc analyses showed that serum insulin concentrations were greater in the CLA-mix group (34%) than the control group (P = 0.02) in the highest waist circumference tertile only. AT mRNA expression of glucose transporter 4, leptin, and lipoprotein lipase was lower, whereas expression of tumor necrosis factor-alpha was higher in the CLA-mix group than in the control group (P <0.04). In conclusion, a 50:50 mixture of c9, t11- and t10, c12-CLA isomers resulted in less total and lower-body FM in postmenopausal women and greater serum insulin concentrations in the highest waist circumference tertile. Future research is needed to confirm the insulin desensitizing effect of the CLA mixture and the effect on the mRNA expression of adipocyte-specific genes in humans. J. Nutr. 139: 1347-1352, 2009.

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