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Conjugated linoleic acid suppresses the secretion of atherogenic lipoproteins from human HepG2 liver cells

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Background - Studies in healthy humans have shown that consumption of conjugated linoleic acid (CLA) significantly reduced VLDL and LDL cholesterol concentrations in circulation. We propose that the mechanism for decreased lipoprotein levels is due to the inhibition of production and secretion of VLDL (measured by secretion apolipoprotein B100 (apoB100)) from the liver
Objective - To investigate the effects of a mixture of CLA isomers on VLDL production and secretion in HepG2 liver cells.
Design - HepG2 cells were incubated for 24 h with 50 μM of the different fatty acids or 50 μM of CLA and 50 μM of a saturated fatty acid (SFA). Effects of CLA were compared to that of a SFA (palmitic acid, PA; C16:0), an n-6 polyunsaturated fatty acid (PUFA) (linoleic acid, LA; C18:2) and a blend of CLA and PA (CLA+PA). ApoB100 levels in HepG2 cells were measured using western blotting. Analysis was carried out using student's t-test and ANOVA.
Outcomes - ApoB100 secretion was significantly decreased in cells treated with CLA and CLA+PA (44%, $p<0.005$ and 62%, $p<0.0005$ respectively) compared to control cells and those enriched with PA. ApoB100 secretion did not differ between CLA and CLA+PA treatments.
Conclusions- Collectively, these results show that CLA reduces apoB100 production and secretion compared to SFAs and plant-derived PUFAs, possibly by limiting the availability of free cholesterol (a requirement for apoB100 production), thus extending available evidence suggesting that CLA is potentially anti-atherosclerotic. Another novel finding of this study was that apoB100 secretion was significantly reduced with CLA even in the presence of PA, despite PA being a strong promoter of apoB100 secretion. A reduction of apoB100 production in the body would decrease the number of VLDL and the number of atherogenic LDL and thus reduce the risk of developing cardiovascular disease

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The effect of chickpeas on human serum lipids and lipoproteins

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Background- Consumption of pulses has been associated with reduction of hypercholesterolaemia and reduced risk of coronary heart disease (CHD). Chickpeas have been a staple part of Indian, Mediterranean and African diets for many thousands of years but are a relatively novel addition to Western cuisine.
Objective- To compare the effect of a chickpea-supplemented diet with a wheat-based diet on human serum lipids and lipoproteins.
Design- Randomized, crossover dietary interventions each at least five weeks in duration, involving 47 free-living adults with at least one CHD risk factor, or a family history of CHD. Intervention diets were isoenergetic to the participants' usual diet, designed to be matched for macronutrient content and controlled for dietary fibre. Chickpeas were consumed in the form of canned, drained chickpeas and in bread and biscuits containing 30% chickpea flour. Results were analysed using repeated measures ANOVA by general linear modelling.
Outcomes- Reductions in the concentration of serum total cholesterol (3.9%) and low density lipoprotein-cholesterol (4.7%) on completion of the chickpea diet compared to the wheat diet. When corrected for the effect of gender, age, total fat, percent fatty acid composition and dietary fibre, the effect of diet on total cholesterol and low density lipoprotein cholesterol disappeared.
Conclusions- Despite attempts at controlling macronutrient intake, the inclusion of chickpeas in the intervention diet caused changes in dietary fat and fibre composition, leading to reduced serum total and low density lipoprotein cholesterol.
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