

INCREASE UPTAKE OF HUMAN LDL BY HUMAN HEPG2 HEPATOMA CELLS AFTER A VEGETAL PUFA-ENRICHED DIET

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Purpose: We have shown a reduction in LDL-cholesterol (LDL-c) levels when type IIb hypercholesterolemic patients were shifted from a standard hypocholesterolemic Mediterranean diet to the same diet modified in its PUFA content. We hypothesized if changes in LDL composition could result in different LDL uptake by liver cells.

Patients & Methods: In a randomized, cross-over study, 12 hypercholesterolemic patients received two isocaloric diets: a MUFA diet, olive oil-rich (MO), and a PUFA diet, containing about 50 g walnuts (PW). Respective fat composition values (% daily energy) were: total fat 30 vs 33, SFA 5 vs 5, MUFA 21 vs 16, and PUFA 4 vs 12. After 6 weeks, LDL were isolated and their lipid and fatty acid composition (LDL-FA) was analyzed. Further, LDL samples were marked with the dioctadecyl indocarbocyanine fluorescent probe Dil) and their uptake by HepG2 cells determined (2.8×10^5 cells/well, cultured in DMEM plus 0.5% fatty acid free BSA).

Results: Total plasma cholesterol (TC) (6%, $p=0.09$), LDL-c (7.5%, $p=0.08$) and apoB (7%, $p=0.06$) were reduced after the PW diet. The rate of LDL uptake was increased (38%, $p=0.15$, $n=12$) by the PW diet, reaching statistical significance when analyzed in those patients whose TC levels were reduced (56%, $p=0.05$, $n=8$). LDL-FA was strongly modified by the PW diet, e.g. in LDL-triglycerides, percent molar concentration (%m) of 18:1 n-9 was decreased by 16% ($p<0.01$), while % m of 18:2 n-6 and 18:3 n-3 were increased by 44 and 145%, respectively ($p<0.01$).

Conclusions: The changes in LDL-FA induced by the PW diet could be responsible for an increase in LDL hepatic uptake and, consequently, for a reduction in LDL-c, apo B and TC levels.

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