

ZINC SUPPLEMENTS REDUCE LDL-CHOLESTEROL AND SYNTHESIS OF LDL

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As reported last year (Samman and Roberts, 1986) a study on the effect of dietary Zn supplements on plasma lipoproteins was carried out in humans. No differences in total- or Lipoprotein- cholesterol were observed with the exception of females, where Zn supplements resulted in a 9% decrease in low density Lipoprotein cholesterol (LDL-C) (2.38 ± 0.15 to 2.17 ± 0.12 mmol/l; mean \pm SE).

Given the reduction in plasma cholesterol due to increases in dietary Zn in both humans and rabbits (Samman and Roberts, 1987), rabbits were used to determine a mechanism for the reduction in LDL-C shown in humans. Two groups of rabbits were fed casein diets containing 21 and 68 μg Zn/g diet for 12 weeks; the latter amount being approximately equivalent to the Zn intake of adult females taking supplements of 150 mg Zn per day. Triton-induced hypertriglyceridaemia was used to estimate the rate of very low density lipoprotein (VLDL) production. LDL apolipoprotein B turnover was carried out using ^{125}I labelled LDL-apoB. Data was fitted to the 2 pool model.

Throughout the experimental period, plasma cholesterol was consistently lower in the animals fed the diet with the higher Zn content. Although VLDL production rates were similar (Table), the production of LDL-apolipoprotein B was reduced in animals fed the higher dietary Zn (Table). Thus manipulating dietary Zn within the physiological range is shown to alter lipoprotein metabolism in rabbits fed casein; increasing dietary Zn resulting in a reduction in LDL production.

Table. Plasma cholesterol and lipoprotein kinetic parameters in rabbits fed varying amounts of Zn^a.

Dietary Zn (ppm; by analysis) ^b	68	21
Total cholesterol (mmol/l)	2.83 ± 0.46	3.54 ± 0.92
VLDL pdctn rate (mmol TAG/l/h)	1.17 ± 0.07	1.07 ± 0.13
ApoB pdctn rate (mg/h)	12.2 ± 0.9	17.7 ± 2.1^c
Size pool A (mg)	210 ± 9.8	219 ± 7.1
Removal from pool A	0.33 ± 0.10	0.56 ± 0.14
pool B	0.29 ± 0.08	0.51 ± 0.13

^aValues shown are mean \pm SE; n=5 per group. ^bvalues shown are means of triplicate analyses. ^c P<0.05

Based on the animal studies, the reduction in LDL-C in healthy female subjects may be due to reduction in the synthesis of LDL. As VLDL synthesis is unaffected and LDL synthesis is reduced, it is suggested that lipoprotein lipase activity may be regulated by Zn intake.

The experiments in animals and humans have shown that Zn has an effect on cholesterol and lipoprotein metabolism. Only further studies will reveal the usefulness of Zn supplements as potential cholesterol lowering agents.

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