

Influence of protein intake associated with coconut or salmon oil on serum, VLDL, LDL and HDL proteins and lipids in the rat. MN Bouziane, J Prost, J Belleville (*Université de Bourgogne, Faculté des Sciences Mirande, Unité de Recherche de Nutrition Cellulaire et Métabolique, BP 138, 21004 Dijon Cedex, France*)

Fish oils contain high quantities of eicosapentaenoic acid (EPA = 20:5 ω 3) and docosahexaenoic acid (22:6 ω 3). These ω 3 polyunsaturated fatty acids (PUFA) have a protective effects against atherosclerosis by lowering serum triacylglycerols (TG) and cholesterol levels. Protein malnutrition increases essential fatty acid (EFA)

requirements. The effects of protein depletion associated with salmon (rich in ω 3 PUFA) or coconut oil (poor in EFA) on various serum parameters (proteins, triacylglycerols, phospholipids and total cholesterol) were studied in young Wistar rats.

Over a 28-d period, 4 groups of 6 male Wistar rats were fed 4 different diets: SAC (20% casein + 5% salmon oil), SAd (2% casein + 5% salmon oil), COC (20% casein + 5% coconut oil), COD (2% casein + 5% coconut oil). Blood was removed, plasma VLDL, HDL and LDL fractions were obtained by a single-spin discontinuous gradient. TG, phospholipids (PL) and total cholesterol were evaluated in serum, VLDL, LDL and HDL. VLDL and HDL-apoproteins were separated by SDS-gradient polyacrylamide gel

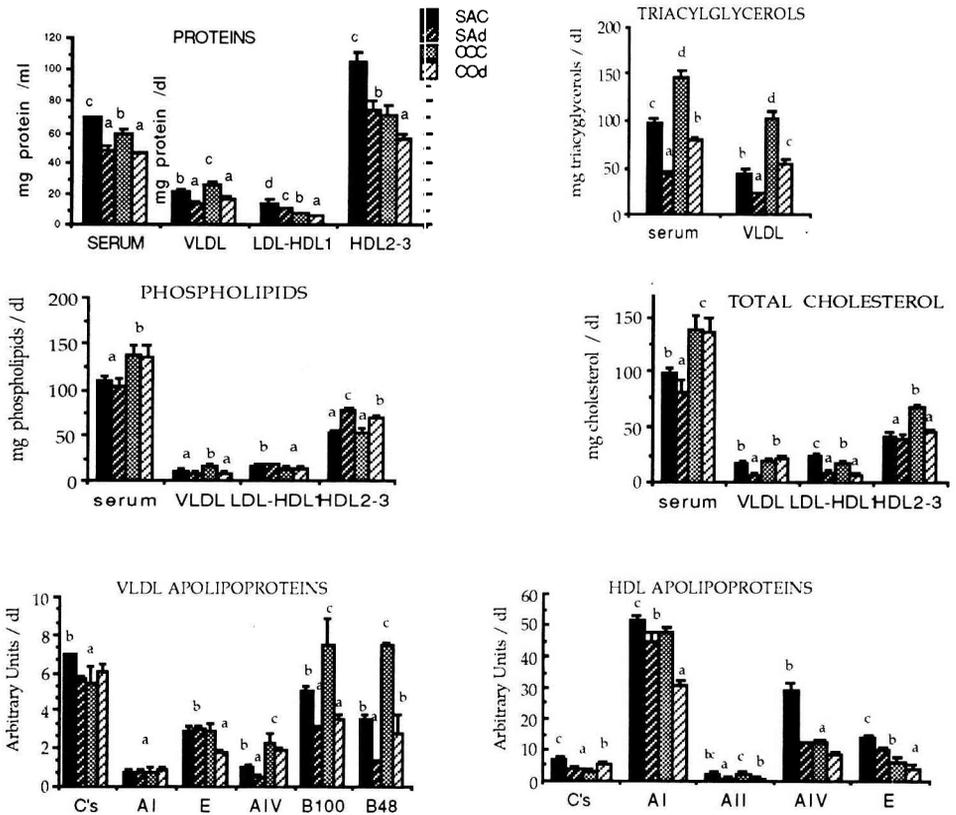


Fig 1. Values are means \pm SE for 6 rats. Classification of the means are performed using Duncan new multiple range test. Means differ significantly if letters are different ($P < 0.05$).

electrophoresis (2.5 → 20%) and quantified by densitometry after staining.

Proteins in serum. VLDL, HDL2-3; TG in serum, and VLDL; PL in VLDL; total cholesterol in LDL-HDL1 and HDL2-3 were lowered in groups SAd and COd, whereas PL were enhanced in HDL2-3. Total cholesterol in serum and VLDL was lower with salmon oil than with coconut oil.

Apo-VLDL. Salmon oil decreased apo -B100, -B48 and -AIV, and increased apo-Cs compared with coconut oil. Protein depletion drastically lowered apo -B100 and -B48 values in groups SAd and COd, apo-AIV only in group SAd and apo-E only in group COd.

Apo-HDL. Salmon oil increased apo -Cs, -AI, -AIV and -E. Protein depletion lowered apo -AI, -AII and -E in both depleted groups, apo -Cs and -AIV only in group SAd, whereas apo-Cs were increased in group COd (fig 1).

The composition of VLDL is significantly modified by protein depletion. HDL-apos are less sensitive to protein depletion than VLDL-apos. These changes involve impairment, particularly in TG transport. Protein depletion diminishes EFA availability and therefore might accelerate EFA shortage. Protein depletion lowered VLDL-TG, -apos and -cholesterol, and impaired lipid transport from liver to organs. This impairment is greater with salmon than with coconut oil.