Under our experimental conditions, the CO diet reduced net oleate oxidation in calf liver. Liver accumulation of TG, previously observed in vivo in the CO diet, could be partly explained by an increase of fatty acid esterification in response to the reduction of the oxidative pathway.

OTHER METABOLISMS

Effects of dietary coconut oil on the density distribution and the chemical composition of plasma lipoproteins in the preruminant calf. D. Durand, D. Bauchart, C. Picherit, D. Gruffat, B. Graulet (Inra, LCMH, Theix, 63122 St-Genès-Champanelle, France.

Soybean oil added to milk replacers for preruminant calves induced hypercholesterolemia by specifically increasing the plasma concentration of high density lipoproteins (HDL). In contrast, the metabolic effects of coconut oil, rich in medium-chain fatty acids (MCFA, C8-C14: 64.9 % of total fatty acids) and presently recommended for high growth performances, are still unknown. Therefore, two groups of seven H × F male calves, aged 15 d, were given a basal milk replacer as the sole diet containing beef tallow (T) or coconut oil (CO) for 19 days. At the end of the experiment, blood samples were collected during the lipid post-absorptive period. Plasma lipoproteins were separated by sequential ultracentrifugal flotation or by density gradient ultracentrifugation. Compositions of their lipids and fatty acids were determined by enzymatic methods and by gas–liquid chromatography, respectively. Plasma contents of apolipoproteins B and A-I were determined by radial immunodiffusion. Compared with the T diet, the CO diet increased plasma-free cholesterol (30 versus 14 mg/dL, $P < 0.05$), cholesteryl esters (CE) (258 versus 127 mg/dL, $P < 0.01$), and apo A-I (129 versus 87 mg/dL, $P < 0.01$) because of specific increases in light HDL (density 1.060 to 1.091 g/mL; 285 versus 131 mg/dL, $P < 0.01$) and very light (type 1) HDL (density 1.026 to 1.091 g/mL; 65 versus 8 mg/dL, $P < 0.01$). MCFA provided by the CO diet were transported in triglycerides of chylomicrons (density < 0.950 g/mL; 23.6 % of total MCFA) and of very low density lipoproteins (density 0.950 to 1.006 g/mL; 15.0 %) and mainly in CE of HDL (44.1 %). Plasma accumulation of light HDL rich in cholesterol in calves given the CO diet can be explained by 1) a higher rate of cholesterol synthesis in hepatocytes resulting from the conversion of MCFA into acetyl CoA, 2) a higher efflux of cholesterol from tissues into plasma, subsequently incorporated in HDL as CE via the lecithin:cholesterol acyltransferase reaction, and 3) a limited uptake of HDL particles by the liver and the steroidogenic tissues.

Comparison of two saturated fatty acid intakes with steady intakes in unsaturated fatty acids on plasma lipids and fatty acids in a monk collectivity study. H. Dabadie[a,c], E. Peuchant[b], M.C. Delmas-Beauvieux[b], A. Cazanave[a], M. Bernard[a], V. Rigalleau[c], H. Gin[c], F. Mendy[a], M. Clerc[b], J. Paccalin[a] ([a]Laboratoire de thérapeutique, [b]Laboratoire de biochimie, Université Victor Ségalen Bordeaux 2; [c]Service de nutrition, Hôpital Haut-Lévêque, 33600 Pessac, France).

If oleate, linoleate and linolenate intakes are actually defined, recommended saturated fatty acid (SFA) intakes are not well known. The aim of our study was to clarify the most beneficial rate in SFA.

Twenty-five male monks without dyslipidemia (mean age: 61 years, weight: 72 kg, and BMI: 25) were provided two isocaloric (2 200 kcal) diets for 5 weeks

each. Diet 1 was 30 % fat (8 % SFA, 12 % oleate, 6 % linoleate and 1 % linolenate), 55 % carbohydrate, 200 mg cholesterol. Diet 2 was 34 % fat (11 % SFA), 51 % carbohydrate and no change in oleate, linoleate, linolenate and cholesterol. Baseline diet (2 400 kcal, 35 % fat, 13 % SFA, 52 % carbohydrate) was provided before each diet for 4 weeks. Samples obtained at the end of each period were assessed for plasma lipids and fatty acids of the phospholipids and cholesteryl esters. In comparison with baseline diet, diets 1 and 2 caused a decrease in total C, LDL-C and triglycerides (TG) ($P < 0.001$); HDL-C was not modified, apoA-I/apoB ratio was increased ($P < 0.001$). Plasma TG was lower after diet 2 than after diet 1, whereas HDL-C was higher ($P < 0.05$). In phospholipids, myristate, oleate, linoleate, EPA and DHA were increased in diet 2 versus baseline ($P < 0.01$) and diet 1 ($P < 0.05$); in cholesteryl esters, linolenate was increased with diets 1 and 2 ($P < 0.05$).

These data suggest that a diet 34 % fat with 11 % SFA and 51 % carbohydrate has beneficial effects on plasma lipid and fatty acid profiles. This diet seems to be more effective than a diet 30 % fat with 8 % SFA and 55 % carbohydrate.

Altered apolipoprotein AI metabolism in subjects with type IIA heterozygous familial hypercholesterolemia: a kinetic study. R. Frénais, C. Maugeais, K. Ouguerram, V. De Mallmann, T. Magot, J.M. Bard, M. Krempf (CRNH and Clinique d'endocrinologie et maladies métaboliques, Hôtel Dieu, 44093 Nantes, cedex 01, France).

Patients with type IIa heterozygous familial hypercholesterolemia (FH) demonstrate an increase in LDL-cholesterol, associated with an elevated cardiovascular risk. Whereas alterations in apolipoprotein (apo) B100 metabolism are well established, potential effects of FH on apo AI metabolism remain to be elucidated. Six healthy subjects and six FH patients (plasma cholesterol 167 ± 24 and 425 ± 29 mg/dL, respectively, $P < 0.001$) received a priming dose (10.10^{-6} mol/kg) followed by a continuous 14-h [$^2H_3$]-leucine infusion (10.10^{-6} mol/kg/h). Apo AI concentration was similar in FH patients compared to controls (113 ± 18 versus 123 ± 18 mg/dL, respectively, NS). Data were analysed using a mono compartmental model (SAAM II modelling software). The HDL-apo AI fractional catabolic rate (FCR) and absolute production rate (APR) were increased in FH subjects (0.36 ± 0.16 versus 0.18 ± 0.04 pool/day, $P < 0.05$, and 17.7 ± 7.7 versus 10.1 ± 2.0 mg/kg/day, $P < 0.05$), these parameters being correlated ($r^2 = 0.955$, $P < 0.001$). HDL-triglyceride concentration was higher (20 ± 8 versus 6 ± 2 mg/dL, $P < 0.01$), whereas HDL-cholesterol concentration was decreased (37 ± 7 versus 56 ± 16 mg/dL, $P < 0.05$) in FH patients. Both FCR and APR of HDL-apo AI were negatively correlated with plasma cholesterol concentration ($r = 0.351$, $P < 0.05$ and $r = 0.327$, $P < 0.05$, respectively). Plasma and HDL-triglyceride concentrations were correlated with the FCR and the APR of HDL-apo AI ($P < 0.05$). Thus, our results suggest that patients with heterozygous FH up-regulate apo AI production in response to an hypercatabolism, which may itself be related to changes in HDL composition.

The hypocholesterolemic effect of soybean is modified by dietary iron content in the rainbow trout. S.J. Kaushik, G. Corraze, A. Mitrenko (Laboratoire de Nutrition des Poissons, Inra, 64310 St-Pée-sur-Nivelle, France).

Teleost fish are generally known to have high plasma cholesterol levels. Recent studies have confirmed the hypocholesteromic effect of dietary soybean in