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Influence of dairy protein on cholesterol synthesis in humans

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de recherche en nutrition humaine, Hôpital Laënnec, 44035 Nantes cedex 01, France).

Cardiovascular diseases are the most prevalent of mortality in non insulin-dependent diabetics (NIDDM). These patients are often hypertriglyceridemic while cholesterol of LDL was in normal range. The apoB100 metabolism was explored in NIDDM subjects by endogenous labeling in large VLDL, small VLDL, IDL and LDL.

Ten NIDDM patients were studied (HbA1C 6.7; 10.3%; BMI 30–33 kg/m²). They were hypertriglyceridemic (TG 1.8; 3.6 mmol/L). Each patient received a 14 h-intravenously infusion (10.10⁻⁶ mol/kg/h) in fasting state. Large-VLDL, small-VLDL, IDL and LDL were isolated by density gradient ultracentrifugation and apoB100 by SDS-PAGE. The apoB100 was hydrolyzed and tracer-to-tracee ratio curves were analyzed by compartmental modeling.

Kinetic analysis showed that NIDDM patients had a production rate of 75 ± 50 mg/kg/day and 2.61 ± 1.1 mg/kg/day for large-VLDL and small-VLDL respectively. Fractional catabolic rates (FCRs) of large-VLDL, small-VLDL, IDL and LDL were 0.29 h⁻¹ ± 0.15, 0.44 h⁻¹ ± 0.15, 0.21 h⁻¹ ± 0.02 and 0.025 h⁻¹ ± 0.004 respectively. Direct uptake was in NIDDM patients, 0–81% of large-VLDL metabolic fate.

This study pointed out the heterogeneity of the apoB100 metabolism in NIDDM, mainly from the metabolic fate differences of large-VLDL.

Insulin resistance in Vietnamese subjects with essential arterial hypertension. VH Minh, LC Thanh, PTB Ngoc, TD Trinh, TD Tho, P Valensi (*Medical School of Hue and Bach Mai Hospital, Hanoi, Vietnam; Jean Verdier Hospital, 93140 Bondy, France*).

Several studies suggest that essential arterial hypertension is associated with insulin resistance in obese and non obese subjects. Malnutrition remains frequent in Vietnam and mean body mass index (BMI) in Vietnamese adults is around 18.5 kg/m².

This study aimed to look for an insulin resistance state in Vietnamese subjects with hypertension. One hundred and eight hypertensive patients (51 men and 57 women) over 40 years (mean = 65.4) were compared with 40 healthy subjects (23 men and 17 women) also over 40 years (mean = 61.0). Hypertensive patients had a BMI significantly higher (mean ± SD = 20.4 ± 1.15 kg/m² vs 18.3 ± 2.13 kg/m², *P* < 0.01), a thicker tricipital skinfold (12.7 ± 6 mm vs 7.0 ± 3.7 mm, *P* < 0.001), no significant difference in waist/hip ratio (0.88 ± 0.06 vs 0.85 ± 0.06). Blood glucose during fasting and 2 h after 75 g glucose taken orally were similar. Plasma insulin measured during fasting and 2 h after glucose ingestion were significantly higher in hypertensives (44.4 ± 5.1 vs 21.6 ± 3.2 pmol/L, *P* = 0.026 and 271.1 ± 21.6 vs 139.1 ± 15.2 pmol/L, *P* = 0.00001). These differences were still significant after excluding subjects with BMI > 22 kg/m².

In conclusion this study shows that healthy Vietnamese adults have a BMI lower than in occidental countries. Hypertension was shown to be associated with a slight but significant increase in: i) BMI which however remains far from the definition of obesity in western countries; ii) fat mass without predominant abdominal adiposity; iii) an insulin resistance state despite the modest overweight.

Influence of dairy protein on cholesterol synthesis in humans. A Avignon, JM Didelot, TC Pham, C Colette, B Descomps, L Monnier (*Department of Metabolic Diseases, University Hospital, 34000 Montpellier, France*).

Replacing standard dairy produce by low saturated fat equivalents is one of the usual advices reduce plasma cholesterol. Nevertheless, this kind of recommendations results most often in an increase in the dairy protein intake. To test the influence of dairy protein on cholesterol metabolism, we submitted seven healthy volunteers alternatively to two 7-day-diet sequences (cross-over study). One of the diet sequences was devoid of dairy produce and in the other one, half of the proteins came from dairy produce. Calories, glucides, proteins, cholesterol, total lipids, saturated, mono unsaturated and poly unsaturated fatty acids intake were kept constant between the two sequences and were fixed at the level of usual intake. Mean protein intake was 93 ± 5 g/day including 14 ± 1 g/day, none and 43 ± 4 g/day coming from dairy produce in the usual diet, devoided of dairy produce and enriched in dairy produce diets respectively. Each of the diet sequences was separated from the following by a wash-out period when the individuals were going back to their usual diet. At the beginning (d0) and at the end (d7) of each diet sequence, the following parameters were determined in the plasma: total cholesterol, triglycerides, HDL cholesterol, Apo A1 and B lipoproteins, and lathosterol. This latter parameter is considered as an excellent index of in vivo cholesterol synthesis. No significant differences were observed for the plasma lipids between d0 and d7. The sequence enriched in dairy produce did not have any effect on lathosterol level (7.9 ± 1.4 at d0 vs 7.8 ± 1.5 $\mu\text{mol/L}$ at d7, NS) as the sequence without dairy produce induced a decrease in plasma lathosterol (8.6 ± 1.3 at d0 vs 7.0 ± 1.3 $\mu\text{mol/L}$ at d7, $P < 0.02$).

These results show that: (i) proteins from dairy produce per se have an effect on cholesterol synthesis; (ii) their suppression induces a reduction in endogenous cholesterol synthesis; (iii) their increase over a given level (14 g/day) does not increase cholesterol synthesis.

Effects of soy proteins on plasma lipoproteins in healthy men. S Auboiron^{1,3}, I Catala^{2,3}, C Juste², FRJ Borne³, T Corring², B Guy-Grand¹ (¹ *Nutrition Department, Hôtel-Dieu, 75004 Paris*; ² *LEPSD, Inra, 78352 Jouy-en-Josas cedex, France*; ³ *Nutrition & Health Service, Eridania Béghin-Say, 1800 Vilvoorde, Belgium*).

The hypocholesterolemic effect of soy proteins has been demonstrated in a variety of animal models, but not so obviously in humans. We have compared the effect of animal versus vegetable proteins on plasma lipoproteins in healthy men. For this purpose, 12 healthy young men (29.0 ± 1.6 years, BMI = 22.7 ± 0.9 kg/m^2) participated in a cross-over design protocol. The subjects were fed an isocaloric diet ($12\,870 \pm 330$ kJ/day, 15% of total energy of proteins, 51% of carbohydrates, 34% of fat and 300 mg/day of cholesterol) where proteins were either mainly from animal origin or mainly from soya origin for two 2-week periods, separated by a 2-week interval on their usual diet.

At the end of each dietary period, after an overnight fasting, blood samples were collected to measure plasma lipids by enzymatic procedures and lipoprotein classes (VLDL, IDL, LDL, HDL₂, HDL₃) after separation by density gradient ultracentrifugation.

Body weight and food intake remained constant throughout the study. No difference between animal and soy protein containing diets was observed for plasma lipids (triglycerides (TG): 0.59 mM – 0.58 mM, free cholesterol (FC): 1.29 mM – 1.21 mM, esterified cholesterol (EC): 4.29 mM – 4.39 mM, phospholipids (PL): 2.05 mM – 1.90 mM for animal and soy diets respectively). No variation was noted in the plasma concentration of different lipoprotein classes. But soy proteins induced a decreasing TG content of LDL: 3.7 ± 0.4 vs $6.2 \pm 0.8\%$ of total particle ($P < 0.05$), while the CE content increased: 43.0 ± 0.9 vs $38.0 \pm 1.2\%$