

erythrocyte vitamin E (nmol/gHB) $18.8 \pm 3.5 / 15.6 \pm 6.5$, $p < 0.001$. The ratio of TBARS to LDL mmol was lower in the controls than in the diabetic patients ($0.78 \pm 0.18 / 0.88 \pm 0.22$, $p < 0.3$) and was negatively related to the serum vitamin E concentration ($r = -0.19$, $p < 0.04$). In addition to the other classical factors linked to the macroangiopathy, an analysis by logistic regression showed that high levels TBARS ($p < 0.04$) and low serum concentrations of vitamin C ($p < 0.01$) are significantly associated with this vascular disease, especially with lower limb attack.

This study provides a correlation between lipid peroxidation and macroangiopathy and insights into a role for antioxidant vitaminic deficiency in the aetiology of atheroma in diabetic patients. Larger clinical trials are warranted to investigate the efficacy of antioxidant vitamin therapies in the prevention of macrovascular complications.

Changes in lipid metabolism after cecectomy depend on diet composition and experimental model. R Sablé-Amplis, R Sicart (CNRS, universit  Paul-Sabatier, rue F-Magendie, 31400 Toulouse, France)

To date, there are conflicting results concerning the beneficial effects of products derived from the fermentation of carbohydrate residues in the gut on lipid metabolism. The main sites of bacterial activity are the cecum and the proximal colon. The effects of cecectomy have been described in hamsters (Sicart *et al* (1984) *IRCS Med Sci* 12, 490-491). Here, we examined the consequences of cecectomies in rats, which differ greatly from the hamster in terms of the morphology of their gastrointestinal tract and lipid metabolism. The animals (6 rats per group) were fed either a standard diet or the same diet enriched with fiber (10% apple pectin) associated or not with cholesterol (2%). The surgical treatment was performed

after 15 d of adaptation to the experimental diet.

In rats receiving the standard diet, the levels of cholesterol (Ch) and triglycerides (TG) in the plasma and liver were not changed 4 weeks after removal of the cecum, even when the diet was enriched with fiber. In intact rats fed the cholesterol-enriched diet, the plasma Ch (not TG) level increased from 79 ± 7 to 126 ± 16 mg/100 mL, while in the liver, the level of cholesterol rose from 253 ± 16 to $1\ 068 \pm 144$ and that of TG from $1\ 068 \pm 198$ to $4\ 214 \pm 909$ mg/100 g of fresh tissue. In rats fed this diet, cecectomy increased plasma and liver cholesterol up to 156 ± 15 mg/100 mL (not significant) and $1\ 765 \pm 81$ mg/100 g ($p < 0.002$), respectively. The ingestion of pectin along with the cholesterol did not change the effect of cholesterol given alone in either intact or cecum-deprived rats.

These results are in contrast with those previously reported in hamsters. In this animal model, the removal of the cecum causes the level of plasma cholesterol to be dramatically augmented (+200%) and especially in animals fed a fiber-enriched diet prior to the cecectomy (+300%).

In conclusion, the effects of a cecectomy, which suppress a large part of the end-products of bacterial fermentation, on lipid metabolism, appear to be dependent on the diet composition and on the animal species used as the experimental model.

Phenotype and genotype of cytochrome P450 2E1, a key enzyme in ethanol metabolism. D Lucas ¹, P Bodenez ², F Berthou ¹, JF Menez ¹ (¹ *Laboratoire de biochimie-nutrition*; ² *Service d'alcoologie, facult  de m decine de Brest, 29285 Brest cedex, France*)

Cytochrome P450 2E1 (CYP2E1) is a key enzyme in ethanol metabolism and is induced after chronic administration of

ethanol. Phenotyping and genotyping CYP2E1 is of great interest as several mutations, described in the CYP2E1 gene, could lead to modifications of the enzymes activity and could thus be related to alcoholism or certain cancers.

A non-traumatic method was recently proposed to measure CYP2E1 activity *in vivo*. Patients were administered a tablet of chlorzoxazone and blood was withdrawn 2 h later. The 6-hydroxy-chlorzoxazone/chlorzoxazone ratio was determined, as previously described, using HPLC (Lucas *et al* (1993) *J Chromatogr* 622, 79-86). This ratio was found to be 0.34 ± 0.15 in controls ($n = 30$) and 1.43 ± 0.6 in alcoholics after 24 h withdrawal ($n = 20$), providing a reliable test for CYP2E1 phenotyping.

For genotyping, a mutation located on the 5' flanking region of the gene (Hayashi *et al* (1991) *J Biochem* 110, 559-565) was determined after the appropriate PCR amplification and digestion of the fragment with *Rsa* I or *Pst* I restriction enzymes. The frequency of this mutation was studied in 620 alcoholic and 226 control Caucasians and no difference was demonstrated between the 2 groups (6.93% were heterozygous for this mutation in alcoholics vs 5.31% in controls). The frequency of this mutation seemed to be enhanced in alcoholic patients with ORL cancers (10.6%, $n = 66$) whereas it was decreased in patients with an oesophageal carcinoma (no mutation, $n = 56$) although this was not statistically significant.

To date, there is no evidence of modified CYP2E1 activity following gene mutation. Further studies including CYP2E1 phenotyping and genotyping in the same subject are required in order to be able to draw a clear conclusion.

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Sulfur amino acid requirements for the maintenance and growth of juvenile rain-

bow trout. M Mambrini, L Seudre (*Laboratoire de nutrition des poissons, unité mixte INRA/IFREMER, station d'hydrobiologie, 64310 Saint-Pée-sur-Nivelle, France*)

The sulfur amino acid (SAA) requirements for the maintenance and protein accretion of rainbow trout reared at 16°C were estimated by fitting a linear regression between SAA intake and nitrogen (N) balance. The SAA needs for maintenance and growth (for 1 g N accretion) correspond respectively to the x-intercept and the reciprocal of the slope (Fuller *et al* (1989) *Br J Nutr* 62, 255-267). Semi-synthetic diets were formulated to contain increasing N levels (0, 2.4, 4.8 and 8.0% DM), using crystalline amino acids and casein, having a composition comparable to the amino acid profile of the fish whole body. The assay consisted of verifying the linearity when the SAA supply was reduced (0 for the diet containing 2.4% and -20% for diets containing 4.8 and 8.0% N). The diets

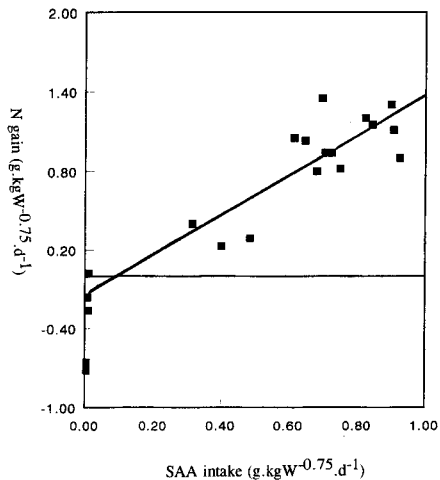


Fig 1. Relationship between nitrogen gain and sulfur amino acid (SAA) intake in rainbow trout (70 g) given diets with increasing amounts of nitrogen with either an amino acid profile similar to that of trout whole body or with specific deletion of SAA. (Mambrini and Seudre.)