

# Effects of Diets Enriched in *trans* Fatty Acids from Industrial or Ruminant Source on Hepatic acyl-CoA: Cholesterol Acyltransferase Activity in Rats

Carole Vaysse<sup>1</sup>, Laurence Fonseca<sup>1</sup>, Jean-Michel Chardigny<sup>2</sup>, Nicole Combe<sup>1</sup>

1) ITERG, Bordeaux, France, 2) INRA and University Clermont I, Clermont-Ferrand, France

The fatty acid composition of the diet influences serum total cholesterol concentration in humans, and consequently the risk of coronary heart disease (CHD). CHD events depend upon the availability of different fatty acids to shift intracellular cholesterol onto a storage pool of cholesterol; this effect is mediated by the acyl-CoA:cholesterol acyltransferase (ACAT) enzyme. In this context, the present study aimed to compare effects of diets enriched in either industrial or ruminant *trans* fatty acids (iTFA or rTFA) on the level of hepatic ACAT activity in the rat. Two groups of 10 rats fed diets enriched with 1% cholesterol and 12% fat (w/w), containing either iTFA or rTFA (22% of total dietary fatty acids) during 4 weeks. Experimental fats differed in their isomer profile: 9t and 10t-18:1 were the most prevalent in iTFA (44% and 19.6% of total t-18:1), while the main isomer was 11t-18:1 in rTFA (69% of total t-18:1). At the end of the experimental period, rats were sacrificed. Analysis of plasma and hepatic cholesterol content has been carried out. Hepatic microsomal ACAT activity has been determined. Results showed that : i) in the iTFA group, the plasma cholesterol ester (CE) concentration was higher than in the rTFA group (1.52 +/- 0.46 mg/L *versus* 1.17 +/- 0.29 mg/L; p=0.03) ; ii) *trans* 18:1 percentage in plasma CE was 1.6 times higher in the iTFA group than in the rTFA group (5.36% of total fatty acids *versus* 3.37% respectively); iii) the hepatic CE concentrations of the two groups did not differ significantly (14.0 +/- 3.8 mg/g in iTFA rats *versus* 17.1 +/- 4.8 mg in rTFA rats), but the level of *trans* 18:1 was also higher in the iTFA group than in the rTFA group (5.89% of total fatty acids *versus* 3.63% respectively) ; v) ACAT activity in the liver of the iTFA group was significantly greater than that of the rTFA group (105.76 +/- 12.80 *versus* 56.08 +/- 11.03 picomoles per minute per milligram protein). These results suggest that iTFA and rTFA could differently control hepatic ACAT activity. *Study supported by grants from the French National Research Agency (ANR-05-PNRA-017) and the French group for Lipids & Nutrition (GLN). Authors thank Nestlé (Lausanne, Switzerland) for the supply of the test fats.*