CHANGES IN THE LEVELS OF PLASMA *TRANS*-FATTY ACIDS REFLECT CHANGES IN DIETARY INTAKE

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There is a need to develop a convenient and accurate index of dietary *trans*-fatty acid intake in order to assess whether the consumption of these levels pose significant health consequences.

The major *trans*-fatty acid isomers (D9, D10, D11 and D12 *trans*-18:1) in the plasma phospholipids, triglycerides, free fatty acids and cholesteryl esters were quantitated in twenty subjects who were consuming a moderate or a very low level of *trans*-fatty acid from margarine and lean beef and correlated with their estimated dietary intake. Two groups of 10 mildly hypercholesterolaemic subjects were recruited. Blood was taken after an overnight fast and their plasma was stored at -20°C. Each subject kept daily weighed food records. The estimated *trans*-fatty acid intake was based on the analysed seven day, daily weighed food records and the *trans*-fatty acid content of margarines, butter, butter-margarine blends, pork and beef fat determined from previous analyses (Mansour and Sinclair 1993). The study comprised three three-week dietary periods. For the first group (group A), the first period was the baseline diet (usual *trans*-fatty acid period), the second was a lean-meat diet with 25% of energy from total fat (moderate *trans*-fatty acid period) with approximately 15% of total energy coming from an olive oil based margarine, and the third period was a lean meat diet without added fat (10% energy from total fat, very low *trans*-fatty acid period).

For the second group (group B), the only difference with the above group was that the middle period was the very low *trans*-fatty acid period and the third period was the moderate *trans*-fatty acid period. Blood was collected at the end of the second and third weeks of each dietary period and aliquots of plasma were extracted into chloroform/methanol and the lipid classes separated on silica gel. The fatty acids were then methylated and analysed by capillary GLC using a BPX-70 capillary column (100m x 0.22mm ID).

The PL fraction contained more than 50% of the *trans*-18:1 isomers in the plasma lipids in all subjects. Baseline plasma levels of total, PL, TG, FFA and CE *trans*-fatty acid varied from 11-69mg/mL, 7-36mg/mL, 2-28mg/mL, 1-5mg/mL and 1-5mg/mL, respectively. For group A, changes in *trans*-fatty acid intake were positively correlated with changes in the *trans*-fatty acid content of total plasma lipids ($P < 0.001$), PL ($P < 0.001$) and TG ($P < 0.05$) but correlations were not significant for FFA or CE *trans*-fatty acids. However, for group B the changes in dietary *trans*-fatty acid intake were not correlated with *trans*-fatty acids from any of the lipid classes. A possible explanation for this observation was that this group consumed significantly less margarine than the group A subjects.

These results indicate that *trans*-fatty acids in the plasma phospholipids may by used as an index of dietary *trans*-fatty acid intake.

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