ESTIMATION OF THE n-3 POLYUNSATURATED FATTY ACID STATUS BY THE ANALYSIS OF PLASMA PHOSPHOLIPID FATTY ACIDS

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The n-3 polyunsaturated fatty acids (PUFA) play an important role in the regulation of eicosanoid production from the n-6 PUFA, arachidonic acid (AA). They are an integral component of the structural membranes of the retina and the brain, and are involved in the regulation of plasma triglyceride levels. In this study, the n-3 PUFA status of 65 normal females and 43 normal males from Geelong who had volunteered to participate in a study on diet and cholesterol was determined by the analysis of the plasma phospholipid fatty acid concentrations. Analysis of 7-day weighed food records of all subjects revealed that both females and males had lower fat intakes and higher carbohydrate intakes than the values reported in the 1983 National Dietary Survey of adults. The mean and median values for the n-3 PUFA in the plasma phospholipids were 88 and 78 mg/L plasma for the females, respectively, and 86 and 90 mg/L plasma for males, respectively. The distribution of the values was skewed towards the lower end of the range for females.

However, the concentration of long-chain n-3 PUFA in the plasma phospholipids, particularly for eicosapentaenoic acid (EPA), in this sample of healthy Australians was higher than values from normal individuals in USA and Spain. It is possible that these subjects were more diet conscious than the general population and that their n-3 PUFA status may have been higher as a result of this. The dietary intakes of long-chain n-3 PUFA including EPA and docosahexaenoic acid (DHA) were estimated to be < 0.1g/day by interpolation from equations derived from recent data of Bjerve et al. (1993). A recent NHMRC working party (1992) has recommended a modest increase in n-3 PUFA intake for the Australian population.

Strategies to increase the n-3 PUFA status were examined in a separate series of studies involving the consumption of diets containing 30% energy from fat in which 2/3 was derived from beef fat, butter, olive oil or safflower oil (O'Dea et al. 1990; Morgan et al. 1993; Sanders et al. 1994). These studies showed that both olive oil and safflower oil at this level of consumption significantly reduced the eicosapentaenoic acid levels in the plasma phospholipids and raised the arachidonate to eicosapentaenoate ratio compared with diets containing beef fat and butter.

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