

Invited commentary

Mediterranean diet, fats and cardiovascular disease risk: what news?

In the 1970s, Keys *et al.* (1986) provided ecological evidence raising the concept of a reduced risk for CHD associated with the traditional Mediterranean diet and a high intake of monounsaturated fat. During the last decade a marked trend has been observed in countries lining the northern part of the Mediterranean sea characterized by a more or less marked abandonment of the traditional way of eating (Ferro-Luzzi & Branca, 1995; Serra-Majem *et al.* 1995; Mekki *et al.* 1997). This is mainly due to urbanization and overall spreading of several traits of the north American-based way of eating and lifestyle. Although less marked, a comparable tendency is observed in all countries lining the southern border of the Mediterranean sea.

Despite a somewhat enthusiastic emphasis put internationally on this traditional diet (Willett *et al.* 1995) this marked regional trend observed raises a key question: is there still a place for Mediterranean-type diets at the beginning of this new millennium? It seems almost certain that the ancient rural Mediterranean diets will no longer survive to modern times. Nevertheless, a key issue is whether most people in these countries will now keep sufficient cultural roots and/or acquire enough knowledge in nutrition to have the capability to adopt a healthy modern Mediterranean way of eating. In this context, nutritionists could play a significant role in generating new data indicating health benefits of various traits of the Mediterranean dietary patterns.

In this issue of the *British Journal of Nutrition* Kouris-Blazos *et al.* (1999) report new interesting findings. Considering that results of Mediterranean studies in Mediterranean populations may be confounded by the association of adult diet with early life, they designed a study in Australia. They compared dietary habits and mortality in two groups of elderly (70 years or more) Anglo-Celt (*n* 141) or Greek-Australian (*n* 189) subjects. Using an extensive validated food-frequency questionnaire they evaluated the consumption of foodstuffs classified according to eight groups. A score was derived to compare the actual diet with the traditional Mediterranean diet (high monounsaturated:saturated fat ratio, moderate ethanol consumption, high consumption of fruits, vegetables and legumes, low consumption of meat, meat products and milk and dairy products). In the study 81% Greek-Australians and only 28% Anglo-Celts had four or more Mediterranean characteristics. The former had remarkably higher legume intakes (6.1-fold) and monounsaturated:saturated fat ratios (2.1-fold). Greek-Australians had a considerable survival advantage over Anglo-Celts, i.e. rate ratio $\times 2.54$ for men and $\times 1.56$ for

women. Nevertheless, in both groups, the principles of the traditional Mediterranean diet were associated with lower mortality rates. Thus, nowadays in Australia in Greek-Australian as well as in Anglo-Celt elderly people the Mediterranean diet provides benefits.

The positive message derived from this observation is that important traits of the Mediterranean diet can be conserved in the 1990s even in population groups not culturally familiar with this kind of diet. Comparable data have recently been obtained by these authors in a rural Greek population. The data reported also suggest that legumes and olive oil are major food items discriminating subjects at lower or higher mortality rates. This relevant observation could be particularly used in counselling people to adopt a Mediterranean-type diet.

It is interesting to recall that a Mediterranean α -linolenic acid-rich diet was shown, a few years ago, by De Lorgeril *et al.* (1994) to markedly reduce mortality due to re-infarction in patients (53.5 years) compared with the usual post-infarct prudent diet. The main differences in food intakes were higher legume ($\times 2.0$), bread ($\times 1.15$) and fish ($\times 1.18$) intakes and lower meat ($/1.48$) and butter and cream ($/5.93$) intakes with the Mediterranean diet than the prudent diet. Regarding fats, the Mediterranean diet and the prudent diet provided different amounts of total fats (30.5 v. 32.7% energy), saturated fatty acids (8.3 v. 11.7%), oleic acid (12.9 v. 10.3%), linoleic acid (3.6 v. 5.3%) and linolenic acid (0.81 v. 0.27%). As early as 6 months after the study started, a reduced rate of re-infarction was observed under the Mediterranean diet, the difference increasing with time until 5 years (-76%).

Although one of the most striking differences in nutrient consumption was α -linolenic acid, it was not possible to determine if this fatty acid played a determinant role. In fact, the specific role of different key nutrients in the effects observed is still discussed. The fact that monounsaturated or *n*-6 polyunsaturated fatty acids lower total and LDL-cholesterol has been extensively studied, as reviewed by Gardner & Kraemer (1995). In addition, the beneficial effects of *n*-3 polyunsaturated fatty acids on lipid metabolism and platelet aggregation have been documented. When looking carefully at some data obtained from human studies it appears likely that lipid-lowering effects and/or reduced thrombosis risk could account for reduction in mortality rates. In addition, dietary fibre intakes or vitamin E intakes have been associated with reduced mortality rates.

Another paper in this issue by Ramirez-Tortosa *et al.*

(1999) aimed to provide new insights in this area. These authors stated that Spain as a Mediterranean country might reduce cardiovascular risks by increasing intakes of olive oil and fish oil. They aimed to test the hypothesis that a combination of olive oil and fish oil would provide benefits as compared with usual dietary patterns or olive oil-based diets in patients suffering from peripheral vascular disease. Dietary periods of 3 months were compared, with fat accounting for 38 % energy.

The experimental diets did not noticeably change clinical index in patients. The mixed olive oil–fish oil regimen did not change total and LDL-cholesterol concentrations but significantly decreased plasma triacylglycerols (–27 %) compared with olive oil or the usual regimen. The cholesterol-lowering effects of monounsaturated fats have not been systematically reported while the triacylglycerol-lowering properties of fish oils are well known. The authors found that the susceptibility of LDL to *ex vivo* oxidation was lower in patients consuming olive oil and lag-time for maximal LDL oxidation tended to increase with the mixed olive oil–fish oil diet compared with the control group consuming a normal diet. That monounsaturated fatty acids reduce lipid oxidation as compared with polyunsaturated moieties is now established. An interesting observation in the study referred to is that fish oil only abolishes the protective effect of olive oil without further increasing the level of LDL oxidation. Indeed, some data suggest that antioxidant components in virgin olive oil could be protective against oxidation. One should also mention that although dietary intakes were generally comparable in the tested periods, the intake of the antioxidant vitamin E was higher with the mixed olive oil–fish oil regimen. Anyway, interpretation of data obtained by chemically-induced *ex vivo* oxidation of lipoproteins is still discussed. Finally, this study shows that the LDL uptake by macrophages was significantly lower after patients had consumed the mixed olive oil–fish oil regimen. This is a worthwhile observation but the mechanisms behind this effect are not yet clearly established.

The studies referred to provide valuable information that indicates the beneficial potential of nutrients which are part of the Mediterranean diet. Nevertheless, additional pieces of experimental information are necessary to evaluate how the recognized benefits of the traditional Mediterranean diet can be conserved or even improved in the new context of the third millennium.

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