Letter to the Editors

New Zealand meat as a source of ω3 polyunsaturated fatty acids

Currently in the world there has developed an emphasis on ω3 polyunsaturated fatty acids (PUFA) in the diet, particularly eicosapentaenoic acid as a possible protection against certain heart and other problems. Whereas previously there has been a swing to ω6 PUFA away from saturated fat it is now felt this has contributed to a lowering of ω3 intake. It is now suggested to include fish or fish oil in the diet and one trial has demonstrated a reduced incidence of heart disease after consumption of only one fish meal a week (Kromhout *et al.* 1985). However, for many, fish is expensive or not to their taste and the most effective fish (oily) is not always the most popular.

Red meat has been looked on with disfavour recently, mainly because of the trend against saturated fat. This communication discusses the relative content of ω3 PUFA (C_{20+}) in meats and the potential for red meats as a source of ω3 PUFA using calculations from previous papers (Payne, 1978*a*, *b*).

The principal results are presented in Table 1 together with results on fish and chicken meat from other publications (Hughes *et al.* 1980; Saharabunde *et al.* 1985).

It can be seen that a small but significant amount of ω3 PUFA is contributed by lean red meat, whereas the contribution by white meat is negligible. Meat from cows given protected fat containing ω6 PUFA also contains negligible amounts of ω3 PUFA. The impact of one fish meal a week depends on what fish is consumed. Snapper (commonest table fish in New Zealand) has no more ω3 PUFA than red meat but the fish with the highest level of ω3 PUFA would contribute an amount per meal equivalent or greater than that from the

Table 1. *The content of ω3 PUFA (C_{20+}) in various foods*

Food	ω3 PUFA (C_{20+}) (mmol/kg tissue)
Red meat	
Beef	1·4
Poly beef*	0·3
Mutton	1·4
Deer	1·9
White meat	
Pork	0·4
Chicken	0·05
Fish	
Tarakihi	35·0
Snapper	2·0
Seafood	
Mussels	28·0
Liver	
Lamb	4·0
Brain	
Sheep	28·0
Cattle	24·0
Deer	13·0

* Given protected safflower oil.

remainder of the diet per week. European fish such as cod would contribute only a small amount whereas salmon or herring would give more than the rest of the diet (Reed, 1979). Another interesting feature is that brain is equivalent to fish as a source of total ω3 PUFA (C_{20+}) although mostly as docosahexaenoic acid. Though brain has a higher cholesterol content (20–30 g/kg wet weight), a meal per fortnight would not cause excessive cholesterol intake. If other offals such as liver and kidney which contain lower cholesterol levels than brain but have higher ω3 fatty acids than lean meat were consumed weekly, then together with lean meat the ω3 intake would almost be equivalent to fish once a week. Indeed the higher ω3 intake probably means higher cholesterol intakes are less critical.

In New Zealand, sheep and cattle are grazed throughout the year so stock are exposed to grass lipids which contain high amounts of linolenic acid (ω3) (Garton, 1967). Though most linolenic acid is partly or completely hydrogenated a small amount escapes hydrogenation and is absorbed and slowly converted to ω3 PUFA (C_{20+}). In contrast, stock given grain, as on a feed lot, are exposed to seed lipids containing mainly linoleic acid (ω6) and there is a very low intake of ω3 PUFA. Stock given protected ω6 PUFA have low ω3 PUFA, and ω3 PUFA content of stock maintained on a feed lot presumably would be somewhere in between that of grass-fed stock and that of stock given protected PUFA (ω6).

Overall regular consumption of lean red meat and brains from grazing stock could contribute as much ω3 PUFA (C_{20+}) as intermittent consumption of fish.

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