

Book review

Food Lipids and Health: Institute of Food Technologists Basic Symposium Series no 11, Edited by R.E. McDonald and D.B. Min, Marcel Dekker, New York, 1996. ISBN 0–8247–9712–4, 480 pp, \$150

The aim of publishing symposium proceedings is presumably to provide a record of the meeting both for those who were present, and, more importantly, for those who were not. This volume succeeds admirably in this latter aim, to the extent that I regret that I was not present at what seems to have been an excellent meeting. Each of the 18 Chapters provides an extremely readable account of the current state of our knowledge in the different areas in which dietary lipids affect health, ranging from the factors affecting fat intake, and the current developments in non-metabolised fat replacers, through methods for analysis, plant biotechnology and food oils, food technology and modification of dietary oils, to excellent reviews of the importance of lipid intake in atherosclerosis, cancer, bone health and development, and immune function.

The simple message about dietary fat is that current intakes in western countries (about 40% of energy intake) are undesirably high, and reduction to about 30% of energy from fat would reduce the premature death from atherosclerosis and coronary heart disease and many forms of cancers. At the level of the supermarket shelf and food labelling, it is widely known that the type of fatty acids present in dietary lipids is also important: the perceived villains are saturated fatty acids, with polyunsaturated, and possibly also mono-unsaturated, fatty acids being beneficial.

The true state of our knowledge is summarised by a sentence in the Chapter on lipids and the immune system: “*There are inconsistencies among the studies reported as to whether the types of fatty acids, ratios between different fatty acids or the quantity of dietary total fat has the greater impact on the immune response*” – or indeed, on any other aspect of health. The problem is that information on fat intake comes from food intake data from population groups, rather than individual (life-long) records of food in-

take, and is compounded by the fact that fat is not the only difference between different diets that are associated with different rates of mortality from the diseases of affluence. Intervention studies, where the effect of changing the total intake of fat, or the pattern of fatty acids consumed, on markers of health are, of necessity, relatively short-term, and therefore their relevance to the development of chronic diseases may be difficult to establish. Furthermore, such studies use mixtures of food oils to achieve a change in the pattern of fatty acids, but it is not only the fatty acid composition that differs between natural oils. Any study using olive oil as a source of mono-unsaturated fatty acids might be expected to yield different results from a similar study using rape-seed (canola) oil, because olive oil is (apparently uniquely among plant oils) extremely rich in squalene, which, *inter alia*, down-regulates endogenous synthesis of cholesterol.

The challenge to nutritionists, physiologists, and biochemists is to disentangle these confounding factors, and attempt to establish appropriate, desirable, and achievable levels and patterns of fat intake. Are all saturated fatty acids associated with health risks? There is a considerable body of evidence that some saturated fatty acids (e.g. stearic acid) may actually be beneficial. Are all unsaturated fatty acids desirable? Both naturally occurring *trans*-isomers and those arising from isomerisation during hydrogenation of oils are perceived as undesirable. Are high intakes of long-chain polyunsaturated fatty acids without hazard? At very high levels of intake, long-chain ω 3 polyunsaturated fatty acids impair haemostasis and may cause uncontrolled bleeding; *in vitro* studies suggest that polyunsaturated fatty acids may impair immune responses; high intakes of polyunsaturates have been implicated in the aetiology of some forms of cancer.

The challenge to the food industry, food scientists,

and food technologists is to produce foods that have the same flavour, texture, nutritional value, and consumer appeal as traditional foods, but contain less total fat and different patterns of fatty acids. Hence the importance of plant biotechnology, to manipulate the fatty acid composition of oil sources, industrial scale enzymic modification of oils, and the development of sucrose polyesters and other compounds to replace fat.

For anyone who is interested in rising to these challenges, this book provides a series of well written reviews. Each Chapter provides sufficient back-

ground for the health scientist to understand the problems of food science and technology, and for the food scientist or technologist to understand the problems of diet and health, physiology and nutrition. The references at the end of each Chapter provide a very adequate introduction to the research literature, and the volume is adequately indexed, with clear diagrams.

David A Bender

*Department of Biochemistry and Molecular Biology,
University College London*