

Saturated Fat and Health: Recent Advances in Research

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Saturated fat of plant or animal origin has been an important ingredient in Western and non-Western diets for centuries. For the past 30 or 40 years, dietary saturated fats have attained a poor reputation especially in relation to cardiovascular health; recommendations to reduce consumption persist even in the face of equivocal or contradictory evidence. This special theme issue of *Lipids* on saturated fat and health presents contributions from a “hot topic” session at the 100th AOCs annual meeting in Orlando Florida, in May 2009.

Two recent publications highlight the importance of this issue. A meta-analysis by Siri-Tarino et al. [1] showed that there was no significant evidence for concluding that dietary saturated fat is associated with an increased risk of cardiovascular disease (CVD). In addition, whereas some dairy products contribute to the intake of dietary saturated fat, a meta-analysis in this theme issue of the available prospective studies showed that dairy consumption is associated with decreases in CVD risk. The latest prospective cohort study confirms this conclusion for full fat dairy [2].

Although some long chain saturated fatty acids raise low-density (LDL) cholesterol in specific dietary interventions, these fatty acids may have a positive effect on the complex of other markers referred to as atherogenic dyslipidemia: increased concentrations of small, dense LDL particles, decreased high-density lipoprotein (HDL) particles and increased triglycerides, which may be a more important risk factor for myocardial infarction and CVD. Several authors in this theme issue have pointed out that

even replacement of saturated fat with polyunsaturates may have a limited effect and low omega-3 fatty acid intake may carry a much larger CVD burden. Replacement with carbohydrates is likely to be detrimental.

Entries in this publication make the point that all mammalian newborns rely on milk, which typically contains 50% of its total fat as saturated fat. Newborns and adults have the machinery to manufacture saturated fatty acids when not present in the diet. In particular, the entry by Bruce German, points out that the brain makes a large amount of saturated fatty acid during myelination. Other work presented in this issue shows that a diet high in saturated fat has very different effects in the presence of carbohydrates than in their absence. A low carbohydrate diet that is high in saturated may actually lead to a reduction in plasma saturated fat compared to one that is also high in carbohydrate, a consequence of reduction of triglycerides in the low carbohydrate diet and persistent *de novo* fatty acid synthesis in the high carbohydrate diet.

From a metabolic standpoint, the existence of desaturases indicates the need to have direct experimental evidence on the role of dietary lipid intake on the circulating species and biological endpoints. Finally, it is clear that regarding saturated fatty acids as one group is an oversimplification. Individual saturated fatty acids have specific functions depending on chain length. The relation between dietary intake of fats and health is complicated and the current publications point to the need to reduce oversimplification. Is it possible that evolution found benefits to saturated fatty acids that current recommendations do not consider? Whereas diets inordinately high in any component, including saturated fat, are likely to be deleterious, finite quantities of a variety of saturated fatty acids may provide distinct benefits to various metabolic processes and overall health.

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